Notebook, E-4296

This notebook covers the period March 1902-February 1903, with a few entries from 1919. It contains notes and drawings transcribed by Edison from other notebooks, including many entries from N-03-01-22 (see "Notebooks by Edison"). The experiments relate to a variety of matters, including phonograph record composition and molding, electromotographs and amplification, and the chemical properties of compounds. Among the entries are speculative notes on electricity, magnetism, and thermodynamics; a list of 285 experiments or groups of experiments to perform; and a list of compounds that fluoresce in the presence of x-rays. There are references to proposed "xyz" receivers and recorders, "marconi" waves, telephones, organic storage batteries, thermocouples, and other apparatus. There are also references to the work of physicist Adolphe Ganot (E. Atkinson, trans., *Elementary Treatise on Physics, Experimental And Applied: Translated and Edited from Ganot's Eléments de Physique)* and other scientists. Some of the entries are indicated as "entered from old books." Beginning on page 61 is a series of "notes from book of March 1902." The book contains 301 numbered pages. Many pages are blank; pages 1-4 have been removed from the book.

April 24 1902 JAE

Experiments for making a recording cylinder for Master records which shall diminish the friction offered to the record cutter on the diaphm, The present wax is not only hard but has a viscosity suffct to make continuous shavings and the friction is great, Not only is there a pressure against the lever by the pressing of the wax when cutting but up and down movements due to the sound waves must be made against this friction produced by the pressure of the revolving wax. It is this friction which prevents the harmonics of the fundamental notes from being fully recorded, While the friction is a small part of the energy in a fundamtl wave, it is a large part or an important part when it comes to the weak harmonics, and also to the gradually dying out of of fundamental, It would seem that a softer wax would offer less friction, This strangely is not true, The friction is greater, and the viscosity greater causing deformation work to be done, The hard material has less coefct of friction & less viscosity, hence the harmonics are better recorded, After innumerable expmts made during several years I have traced the trouble of getting records of good tone quality down to the above + find that to obtain perfect quality it is necessary to discover a material for recording which shall 1st Have no viscosity or drag

2nd To require scarcely any power to remove material hence small friction to up + down movement of the Cutter, as well as thrust on the cutter lever,

3rd To have a smooth surface when cut so as to give no scratching sounds

4th to give off very little if any vapor so the record surface can be coated with gold by the Vacuum process or if possible by chemical means, phgo etc

5th Not to absorb water when put into the Electrolytic plating bath for depositing the backing

I find after much expts that a record blank of this character is a very formidable proposition

April 24 1902 J.A.E.

The nearest approach to it up to date is the formation of a solid cylinder by pressing with the hyd press Zinc Oxide, The pressure being about 50 atmos per sqr in. This is bored out put on a phono, Turned true by the saphire knife, The recorder has an advance point of large radius which is in advance of the record, The Reader therefore rests on the cylinder.
The zinc ox is an excessively fine powder, so fine that the particles can scarcely be seen by a Microscope but the cohere by the pressure, The knife removes the material as a fine dust, leaving a very smooth groove + record and there is scarcely any friction or work to be done = The cylinder is very porous and easily indented so no reproduction from it directly is possible but if put into the Vacuum + gold plated, and then the oxide made to absorb a low melting point paraffine it can be put into the Electrotypic bath + plated thickly + used in our reg moulding process; After plating the Zinc ox cylder is removed by soaking in alcohol + water when its becomes crumbly
A precipitate formed into a cylinder either by pressure or a soluable binder is the right principle I think —

I have tested a large number of pressed precipitates etc

Nickel Phosphate, Strontium hydrate, This would carbonate + may not be reliable, Barium Carbonate this is nearly as good as Zinc Ox it cuts harder than Zinc at same pressure; Bismuth Sub-Carbonate cuts easily its close to ZnO — Acetate Strontia fine grain cuts very easy but I had to powder in mortar + there were grains, possibly it could be got free chemically, or by floating + decanting from powdered material, Acetate of Mercury if it could be got fine + even it would be ideal scarcely any power required to record,
Lead Sulphate not so good — ZnO Lead Carb if grain was finer wld be good —

April 24 1902 JAE

Note - Tannate of Tin when pressed 150 at transparent, polished cut just like an exceedingly hard wax, but far harder than anything we ever had, This is a new lead, pressed salts of organic acids & inorganic bases. 150 at,

Aniline Green if ground fine would press to a wax? 150 at

Material marked Sulphate of Antimony. which may be Sulphide? when pressed 150 at, cuts smooth like wax, it has checks, if made fine chemically or by floating it could be pressed to a very hard cylder giving a smooth cut and powder for chips = 150 at

Stannate of Soda when fine is hard, 150 at

Nitrate Mercury. when powdered is hard + like a wax - 150 at,

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Experiments with the slides containing 48 receptables each containing a seperate lot of chemical crystals mostly by wet crystlzn, mostly double salts, up to date I have 75 slides made,
To test the phosphorescence I went into the dark room, remained 20 minutes + then had Fred Ott bring in 2 slides at a time, the slides were exposed for 15 sec to the light of a ~~mark~~ naked arc with 65 amperes 3/8 Carbons Slides held 12" away in 5 seconds I had them before my eyes, the Double doors prevented any light from getting in when Ott entered —

April 24 1902 JAE

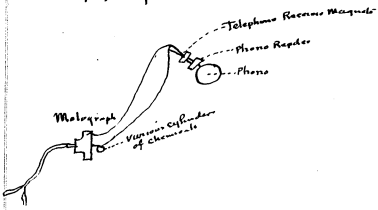
75% of the slides showed phosphorescence, any fully 25% of each slide containing 48 sets of Cryst were phosphorescent, nearly all ceased to phos in 5 sec a few remained for 10 to 15 sec —
The following phos'd for 10 to 15 sec

No 8070 Cresotinic acid + K_2Co_3 + $BaCo_3$
" 7173 Borocitric acid + $SrCo_3$ + $Al_2(OH)_6$.
" 4807 Cyanide of Thoria + Cyanide of Bismuth
" 5006 Cyanide Pot + Chlorides Copper + Lead
" 5081 Cyanide Pot + Chlorides of Barium + Aluminum
" 5175 Cyanide Pot + Chlorides of Cerium + Strontium
" 5077 Cyanide Pot + Chlorides of Barium + Ammonium
" 4700 Cyanide of Zirconium + Cyanide of Silver.
" 2705 Acid hydrofluoric + NH_4OH + $PbCo_3$
" 1075 Barium Carbonate, latter only small section of crystals ∴ Thus dont understand this —

Tried putting in a rey cylinder in wood alcohol to dissolve out some of the ingredients so as to give a porous easy cutting non viscous surface — The Alcohol does it, but the white surface is dragy + viscous, It will be necessary to make a special soap or wax compounds so that the viscous part will be dissolved out leaving the powdery non viscous material behind — Walter Miller is working on this with ideas suggested by me,

May 4th 1902

Molograph Exp'mts



I find that when Phonograph started & reg Bell put in at Mologr, young Ott could just barely, barely detect the sound, but when Mologr put in it so loud and has at least 2/3rds of the volume of the original sound, The quality is perfect—

Following cylinders have been made and tried, 150 atmos pressure

Wet with 3% Solution KOH

Venetian Red absorbs lot solution, smooth, tends to squeeky not loud, polishes, loudness 1/3rd of $BaCo_3$ cylinder

Oxalate Manganese smooth 1/3 loudness $BaCo_3$ take considerable solution.

Alumina Oxide Rough, dont take moisture well no sound

Oxalate Barium Takes solution well 3/4 as loud as $BaCo_3$ can probably improve it by varying pressure of making. It polishes & is smooth.

Sulphophenylate Barium Dont take liquid,

Ammoniated Copper, Broke

Lead Sulphate made only few turns when cracked pbly no good heard nothing.

Stannate Soda Wldnt take liquid.

Ammonium Sulphite, Dont take moisture

Ammonium Benzoate "

Fluoride Copper, rough, no sound,

Carb Soda Anhyr — no sound

Strontia hydrate fair volume sound, broke out, soft,

Nickel Phosphate Low, very smooth, polishes good
may be good if pressure varied

Barium hydrate very rough, just hear it, too hard,

Copper Monochloride — no sound

Acetate Mercury. KOH Kills it, no sound,

Antimony Tartrate no sound, rough,

Chalk 2/3 loudness $BaCo_3$ —

S S Barium Carbonate A1 - best yet! Tough, cylinder nice
easy to work, polishes beautifully, stands heavy pressure
Loudest of all so far tried, made in press with 150 Atmos
pressure, Am going try various pressures, and various
moistening solutions

Barium Peroxide — very hard, at certain degree of
moistening, loud as chalk + nearly as loud as $BaCo_3$
over wet it then went bad - Experiment with it

Copper Formate NG

Sulphate Potash NG with KOH, should try water

There is little doubt but that I shall be able to reproduce at a distance sounds louder than the original, This will permit the devising of an app for Deaf people, a telephone Repeater, Recorder for telephones, or Improved Telegh System ——

May 6th =
Further tests of cylinders for Molograph

Zinc Carbonate Noisy 1/2 as loud as $BaCo_3$

Carbonate of Magnesia Lumpy noise 1/5th as loud as $BaCo_3$

Magnesia Oxide turns bad in lathe, chips out, rough barely hear music NG —

Iodide Lead, Chips out in turning in lathe No sound.

Cobalt Oxalate fairly good surface polishes, Sounds low

Cobalt Cyanide 1/4 of loudness $BaCo_3$ polishes nice. Dont take moisture,

Copper Iodide dont take moisture, no sound, bad surface

SS
Fluoride Calcium pretty good = Phenomenon ..
wet it 1st with Kott 2@5/- loud + good, kept wetting it more got hoarse, then wet it with water immediately got louder
Make another one or 2 Try water only at 1st.
polishes smooth but not so good as Tungstic acid
but it is so good that it must be put in the 1st class of Tungstic acid, Chalk, $BaCo_3$. WO_3 standing best so far

S S

Tungstic acid cylinder is the best so far found it has fine properties, polishes beautifully smooth, a black surface forms. It is very smooth and scarcely gives any sound except slight lumpy sounds when I turn fast & these are probably due to mechanism or eccentricity of cylinder. It takes lots of KOH, probably combination takes place, It is as loud as the best $BaCo_3$ without the scratch & lumpy sounds, Can turn slower without change in volume of sound than $BaCo_3$ or others so far, The quantity of Music is fine,

The Palladium contact was turned to a 3 inch radius so its always adjusted now which is a great gain,

May 9 1902

A lot more cylinders have been tried will enter them Sunday One cylinder has turned far superior to any so far it is

Carbonate of Strontium S S

This cylinder is about twice as loud as any so far, takes lots of KOH made them at 50 100 125 150 200 250 300 atmospheres pressure all were nearly alike, 300 was harder & not so soft for sound & 50 was rather soft as it would be liable to be over moistened & injured I adopted 200 atmos pressure made a large number, find that a cylinder put in small paper box had to be wet again after 15 hours no sound give probably surface moisture evaporated & absorbed by paper box — Will try putting in tin foil — Tried a palladium flat about 3/8 wide instead of the 1/16 wide there was no gain in loudness,

It would not stand as much resistance inserted in line as smaller piece, but it would undoubtedly stand a heavier Current + give consequently a louder sound,
Where the line has large resistance, the point should be made as small as possible,

Thinking the Current generated by the Turning of the Cylinder might perform some function I tried inserting a cell of Leclanché + regulating its Current to stop or oppose the Chalk Current but was unable to do so,
A Condenser put in line stopped the Current,
4 or 5 Microfarads reduced sound 1/2 I should say
I noticed a tendency after 1/2 hour of spots on cylinder getting hard + giving no sound —

Moistened a Tungstic Acid Cylinder with Dilute Sulphuric acid loudness about 1/4 of $SrCo_3$ = This is first instance of obtaining sounds with an acid solution, " "

With good $SrCo_3$ + 1000 ohms I cannot hear Bell receiver whereas the Microph sounds could be heard by me in the room —
Altogether $SrCo_3$ may be considered perfect as far as can be now seen,

$SrCo_3$ 200 atmos pressure wet with 20% KOH, is by far the loudest and best yet.

$SrCo_3$ 200 At, wet with saturated Sol of SrCl. 1/8 as loud — Wet with BaOH 1/5th as loud —

following cylinder tried 150 at.

Mercury Succinate, no sound takes but little KOH

$SrCo_3$ 200 at water only ½ to ⅓ loudness of 20% KOH

$SrCo_3$ 200 at 1st wet with concentrated glycerine, with stick of KOH dissolved therein – ⅛ loud of best, wet ontop of this with H_2O ⅓ loud – this shows that probably considerable glycerine could be mixed with the KOH
tried $SrCo_3$ at pressures varying from 50 to 300 atmos – from 100 to 300 there is apparently no difference, adopted 200 at.

Copper Benzoate. KOH, nq – KOH, 20% – 70% alcohol – no sound –

Bond paper disks made into cylinder dont take up much KOH – no sound. the Bell Magneto gives currents too weak for this probably ——

Animal Charcoal – just hear it.

Sulphide Mercury – just hear it no sound, hard, rough – takes lots KOH –

Effloresced Sulphate Iron little rough, takes KOH good no sound –

Bismuth Sodium Salicylate very smooth, scarcely takes any KOH – No sound, try Alcoholic KOH,

Stannate Soda no sound dont take Rott,

Fluoride Iron smooth polished Track takes in Rott fine precipt ferrichydrate, Freddy can just detect sound — Strange?

Rawhide, takes very little Rott — no sound to perfectly smooth, waxed work probably with strong Current

Soapstone rough — no sound dont absorb Rott,

Nickel Oxide very smooth, sounds very weak —

Oxalate Nickel swells up + cracks must be pressed wet so wont swell up, dont hear sound —

Tungstic acid — Very smooth so smooth cant heal scratch with tin takes, only wants moderate pressure + speed, loud about 1/2 of best $SrCo_3$ tried a new one with dilute sulphuric acid, same degree loud — This is 1st Track where an acid solution has given good results — try Molybdic, Tungstic. Unusf phosphomolybdate of quinchen wet Rott try phosphoric K,

Bismuth Sub-Carbonate about 1/2 loud of $SrCo_3$ — takes plenty Rott, tends to squeak, probably pressed to hard — Vary the pressures!

Strontium Phosphate takes lot Rott, 1/3 loudness of $BaCo_3$ — smooth —

Try Arsenates Fluorides,

Zinc hydrate, dont take KOH. Rough – no sound

Magnesium fluoride. 2/3 loud of $BaCo_3$ – smooth takes pretty KOH – Vary it

Zinc Carbonate smooth. H_2O first KOH 2nd no sound

Bismuth Oxychloride takes KOH fine scarcely hear anything –

Aluminum Hydrate – pretty fair takes KOH very slow not smooth, lumpy ½ loud of $BaCo_3$ – something in it Vary it

Barium Hydrate Very rough – Dry – no sound

Cadmium Iodide – Dont take KOH no sound smooth,

Copper Carbonate, rough no sound

Calcium fluoride wet with H_2O no – with KOH, not so loud as 1st one something wrong somewhere,

$BaCo_3$ turned off in mandril. 300 at loud rough – hard – 200 at safter about same loud 150 at very much safter (?) smoother + good, Cant hear roughness when music coming louder – polishes ok – Notice to slightly crystalline under Micro while $SrCo_3$ shows no signs of Crystlzn – this is poly reason $SrCo_3$ is so much superior to Chalk or $BaCo_3$ – $BaCo_3$ + $CaCo_3$ wear pen while $SrCo_3$ dont ?

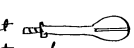
Made some metallic balls like phono reproducer balls about 1/32 or more dia —

Iridosmium on $SrCO_3$ — No sound ?? } Strange ?
Iridium ball — 1/2 loud of reg
must be something in surface action of the metal,
I notice when a ball is used there is lots of lumpy sounds — not produced by the flat surface.
The Ball is evidently impracticable & reg —

Tried pen made of a flattened Crystal of Pt Henry Magnetite, no sound — but it has very high Res —

Iron pyrites pen 1/3 loud of $BaCO_3$ —

Gold point on $SrCO_3$ — about same as palladium — think can use it as a substitute if cheaper — track blackens while Pd does not, this seems to make no difference in loud, although in time it might go bad —

Put in a Palladium wire point 
gave 3/4 of loud of Reg — but no lumpy sounds like Ball —
I notice that with this track pens 1000 ohms inserted when pressure is heavy 1/2 the loud, whereas when pressure is light can scarcely notice any change — office lessening the pressure reduced sound 1/2 = This is probably due to great increase resistance of chalk & 1000 ohms becomes a small part of the total —
Effort concentrated over smaller area
Tried platinum ball — 1/3 loud — cut surface —

Bismuth Oxalate, 3/4 load of $BaCo_3$ —
takes KOH slowly it was pressed too hard, try
varying pressure think there is something in it,

Cerium Oxalate, takes KOH poor, Rough, just hear it

Strontium Oxalate - good as $BaCo_3$ —
smooth, takes up enormous quantity KOH —
very porous —

Uranium Yellow started good — KOH swelled
softened it. Make another moisten with KOH.
Etc,

Mercury Chloride — turns black by KOH,
no sound - squeeky —

Zinc Oxalate Can scarcely hear -

Hg Chloride Sublimed, squeeky - no sound —

Aluminum Hydroxide, started up good - 3/4 load
of $BaCo_3$ Lumpy - busted when put too much
pressure on takes KOH poorly there are 2 hydrates
got from Merck dont know which one this is —
Retest diff pressures —.

Calcium Carb precip — rough - takes little KOH
1/2 to 1/3 load of $SrCo_3$ — broke, this old standard says
is evidently poor material Compared to $SrCo_3$ —

Bismuth Iodide Rough no sound decomposed
by KOH —

Walnut Hide, no sound dont take much KOH —

Left a $SrCO_3$ in closed telephone all night full loud when left - next morning 3/4 loud without rewetting, Think in closed chamber with sponge it will not require wetting more than every 2 days possibly much longer —

Box wood Cephalin, Ivory, Sheepskin — no sounds —

Cadmium Oxalate 1/5 loud of $BaCO_3$ — rough —

Barium Sulphide — no sound — so squeeky Cant work it, dont take KOH —

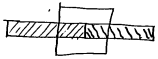
Cerium Carb — 1/3 loud of $SrCO_3$ — dont take in KOH good — pressure too great on making =

Note = Think every material gives best results when made at a certain pressure —

Today finished & tested a Receiver with small phono diaphm — its very much better & 25% louder than with big dia — it had a built up Mica dia same as used in new reproducer of phono — am going try stiffer diaphms tomorrow — will probably get it even louder — Hereafter I adopt the small diaphms

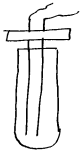
Jany 10 1902 Entered from old books

Thermo—



1 A ferrule of a metal having a very small expansion is reamed out and the thermo couple are ground to size that gives fit when cold On heating thermo expands more than ferrule & is thus under great compression Iron probably best, for ferrule. Might try a couple under hydraulic Compression —

2 Try mixture of the salts of a good thermo alloy & reduce by Zinc etc & Compress – also plate the alloy if it will plate Electrolytically

3 

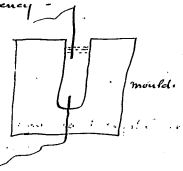
See if passing 100 Volts thro non conducting liquids, any become luminous in dark— might try higher voltage also coil sparks. Electrodes in later case well insulated as they emerge from liquid—

No 4 Put in sealed tubes cold saturated solutions of salts Then add some extra salt cryst then heat to dissolve these Extra crystals, then cool tube the crystals will then be formed under pressure, See if changed – Try fluorescing Crystals if fluorescence changed—

5 Crystalize some hot saturated solution of Cuprocyanide of Potassium The fluorescing kind under powerful X rays see if there is a change in the fluorescing power, Try also Uranium Nitrate + Benzoate, and all other fair X ray fluorescing crystals in neg book of original experiments, Also try Oxalate of Lithia to see if X ray changes its character as an arc light fluorescer— Also crystalize a mixture of Oxalate of Lithia + Cuprocyanide of K together Also Oxalate Lithia + platino barium cyanide + other X salt in mixture to determine any change,
Test them as X ray fluorescers + for Light fluorescence.

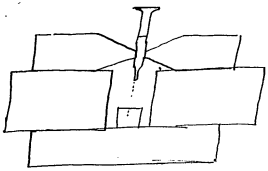
6 Try some Stobie Nickel ore as a thermo, melt + cast some also, it melts wonderfully easy.

7 Try casting some of best thermo alloys in powerful Concentrated magnetic field— Try with iron mould + brass mould Also in soapstone pressed powdered lime &c Try putting wire top + bottom of mould so powerful current passes as it crystalizes may change crystalizn + raise efficiency -



8 For thermo make 5% out of all the acid forming metals with basic oxide forming metals Cr Wo Ur Mo Ar Sb S Te Se Si - should be good with K Na Mg Hg Fe Ni

9 See if viscosity of organic & inorganic liquids, or same with salts dissolved therein is changed in a magnetic field, by light free from too much heat & by X ray -



also try liquids with iron salts, with X ray try phosphorescent salts, Also very sensitive hydrometer,

10 = See if X ray alters surface Tensions, bubbles, camphor floating etc,

11 Crush out flat best thermo see if destruction of crystals impair thermo efficiency.

Duplicator

12 Stress Tourmaline (crossed to be opaque) by Magnetism Elec alternating, X ray + note effect on light.

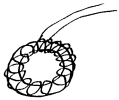
13 Be sure and make some very fine Calcium Tungstate mixed with powdered magnetite 1 of $CaWO_3$ to 2 of magnetite 400 to 600 mesh + put on paper to make sharp X ray photos, the opaque magnetite preventing side lights + blurring —
Do something with the phosphoroscope to get sharp photos prevent light from going sidewise, Note Aug 18 1919 should be analogous to Lumiere's Color screen plates

14 Get glass diffraction grating say 3 or 4000 lines, Vacuum flush with silver then gold, then plate in Copper bath + strip from glass.

Square cell with Copper sulphate

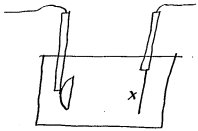
15 polished gold plated electrodes — placed sidewise in powerful magnetic field, + plated by a weak current; see if more on one side than the other, (10) see if plating follows lines of magnetic force,

16



Closed ring of iron in oil under hydraulic pressure get throw on galv with pressure on + off.

16

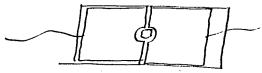


Electrode of Copper concave + focussed on silver plate x slight current, shellac back see if Electrolytic lines can be focussed,

17 Photograph in a powerful magnetic field, ditto in high vacuum —

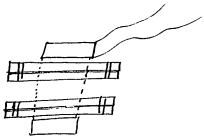
18 See if passivity of iron is destroyed in magnetic field, use polished iron plates,

19 Use pin head drops of crystalizing solutions on polished clean glass prepared and crystalized
1st in the dark
2nd in Magnetic field
3rd in X ray field
4th glass electrically charged all around thus



5th in good light,
6th Suddenly by heat,
7th in presence of certain non crystalizing substances
8 in different solvents,

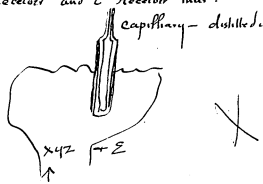
20



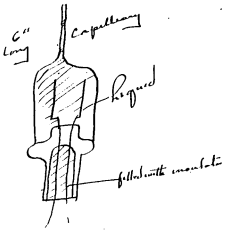
2 polished iron tubes within coil, pined together at one end then one tube twisted as far as possible in one direction + the other in the opposite direction + then pinned together get throw on galv before + after torsioning –

21 Reading in Phil Mag that diaelectrics expanded on stressing independent of the charge then make an XYZ Receiver and E receiver thus.

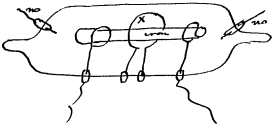
capillary – distilled water + other diaelectrics



22 A Better device than in 21—



1st get vacuum then break capillary under the liquid & let it go in—



23 Iron CP— Silver cone X determine Kick with + without vacuum— Vac should be so no spark passes
Use separate bulb with sparking point to determine when Vac good, make Kick exports while on pump—

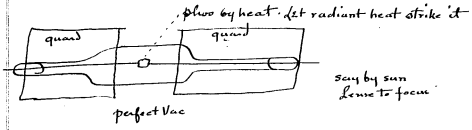
B. Battery Cell—

Crystalize Oxalate Li + X ray fluorescence in chloride of great solubility also ~~other~~ other salts of great solubility. to see if crystals change also from
24 different solvents and in presence of different things also rapid + slow crystalizing + in dark—

25 Try plate Cobalt on Iron
Copper " "
Brass " "
Silver " "
Zinc " "
Cadmium " "
Gold " "

Then put in chamber pass hydrogen + see which metals weld to the iron and approx the temp, think all will stand or yellow except perhaps Cd + alloy at surfaces making them integral as with Ni + Fe
Try plate iron wire with platinum by coating with Pt Chloride pass it + bring to weld + repeat + then draw + repeat + have Dally try for Vacuum —
I think platinum cylinder could be forced over iron rod and welded in Hydrogen by heat it could be drawn down + be used in lamps if not Fe then Ni or Co,

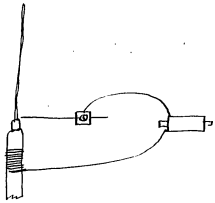
26



This will show if radiant heat pass perfect Vac ← make crystal phosphoresce,

27 Rig up sensitive balance for weighing so scale beam at one end is in conc magnetic field See if weight of dif substances same with field off + on, also saturated solutions hot + closed to air change wt on cooling + crystalizing

28

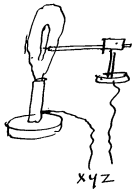


Sensitive flame, Sensitiveness is at the orifice of burner make slot fine + connect spark coil across, also use Ethereic spark. also 2 pieces foil on a glass tip + C try various dances to alter flame, X ray field, also along wire, a beam of X

29 Meusels double Iodide of Hg + Cu blackens at 70 cent if painted on paper + starts to blacken Heat Photo also heat of Electrolysis. platinum point, chemical paper try if blackens by C + XYZ

probably Electric X rays

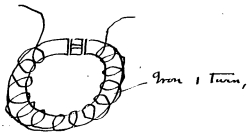
30



Platina tube or Ni tipped with Grafite pencil. in inner flame any C or XYZ. Tear off C + increase luminosity flame locally near point, Should be Marconi. too –

31 Get some Acheson Grafite sticks

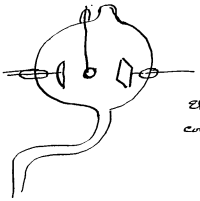
32



Air gap take kick + then insert the buttons made for molograph see if any substance changes kick —

33 Put telephone Molograph Recvr in conc magnetic field + with constant phono Record see if on + off of field produces change.

34

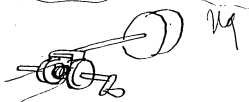


look out for static attraction better use Electromag than static bz constant.

Exhaust to X ray stage then to perfect Vac try outside magnet to attract while getting Vac see if diminishes when spark goes thro

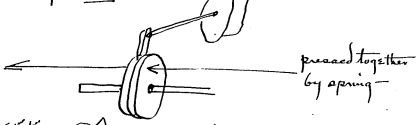
35 Best thermo alloy 1st test then put under greatest hydraulic pressure, retest, also one end pressed other not, press several alloys also iron to iron one pressed the other left soft —

36 Motogh. possibly platina point rubbing on cylinder made of best thermo alloy etc will act by current generated by the rubbing heat to increase & diminish friction, if circuit used & key opened & closed & we get an effect on diaphm then this arrangement would act as a very sensitive Elec receiver as the incoming current would neutralize the thermo & the alternate waves strengthen it it would also do away with difficulty of wetting chalk might act as XYZ Recvr —

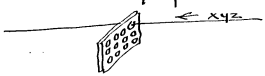


37 Magnetic Motograph, if rotating mag be laminated might be very sensitive, should be permanently magnetized might be good telephone Recvr —

38 Design a Motograph with a disk of glass. or other transparent substance This disk rotates, pressing against it is a metal disk connected to Emg — A ray of light or heat or X ray or XYZ passes thro the friction surfaces thro the glass, changes the friction, This might be a very sensitive Recvr for light, X ray heat possibly Electrification by disks of metal in proximity —

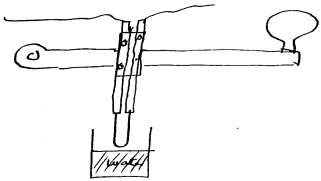


39 (XYZ) Recover Use small dry plate, (photo plate) interposed in dark cover, between poles of a circuit over which XYZ proceeds



40 Heat a loop of wire made of dif metals Loop to be worked by a Key or loop dipping in water a heated by battery also flame. sudden evaporation sending an (XYZ) wave over wire Use Fe Ni Co Zn Cu Pt Pd Sr Cd brass & other metals

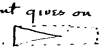
Metal heat wave by bolometer



41 – Some phenomenon should come out of passing waves through junctions of heaviest + lightest metals, Tungsten + Mg di. etc,

42 By making a thin plate of Celluloid say 20/1000 about 4X4 covered by disks of metal say ½ inch diameter making each disk a separate metal of those which can be got in disk form and then laying the plate of disks over a photo dry plate covered with thin black paper we get a XYZ Recorder, The wire carrying XYZ being connected to each disk say 10 minutes test this with all sources of XYZ 1st test by leaving it 24 hours on photo plate to see if metals themselves give any rays also 24 hours after metals have been exposed to good arc light for 10 minutes also after heating all the disks also after being in strong Mag Field

43 See if Nickel will displace Cu as a commutator bar where carbon brushes are to be used.

44 XYZ Tellurium point gives on chem telgh a dash like this 
gives it that way no matter how long current kept on this is strange especially as there should be no polarization on moving paper Its the hydrogen pole Why does it cease? Perhaps its not the effect of Electricity To test this see if Te morse signals can be Tailed out by using Res + Condensers try + get smooth paper or an Alumina hydrate surface on paper or metal surface of phono record, If not due to E then unlimited speed is possible on Cables with Te point It may be a XYZ Recor—

Notes from book of March 1902

45 Sensitive chemical paper for recording by the Current + XYZ =
Tellurium point. H pole
Ferridcy K + NaCl ½ + ½
Iodide K 1 lb. gal with starch,
Try Selenium point (crystalized)
" Alloy Pb 10 Se 90
" 20 Se 80
" Te 80 Se 20
Te 50 Se 50
Surface coated Ni hydroxide KOH moist raise to Ni_2O_3 by ct,
Chloride K + phenolphtalein, H side
Pb hydroxide, reduce to black by H,
Iodide K starch + phenolphtalein, Double pen or reversals
Silver pen Chlk organic matter surface expose to light + develope. 1919 Paraphenylene diamine

Monel metal for Commutators, its higher Res

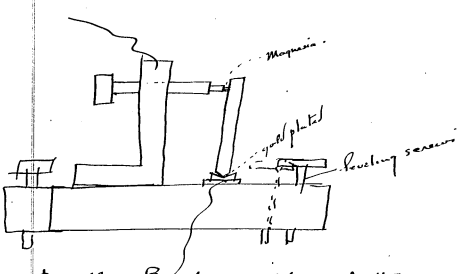
46 Use metals for chem paper points + base of same kind + a solution of the metal saturated, there will be a depositing solution unpolarizable deposit will scrape off by moving surface + give black deposit on Hydrogen side,

47 Chem paper Continued Aniline hydrochloride + Ammon Chlorate mixed ditto Chromic acid
Zinc cylinder + Zinc point. Paper moist Sulphate Zn also try amalgamated point, also KOH saturated with ZnO —
Cu Cu CuSO4 Ag Ag Nitrate ag
Ag Ag AgCy+K Pb Pb acetate pb, also
Pb in KOH — Fe Fe — Sulfate Fe Ni Co
cylinder + point in Sulphates,
Bi Bi + Nitrate Bi Cd Cd sulfate Cd
Sb Sb KOH saturated with acid oxide
Prussian blue KCy, Hydrogen side gives K + destroys Color
Hyposulphite Na or K with dif metal points

48 Two dead flat surfaces of Magnesium 1/2 inch square buffed May with its own pressure be insulated by the thin film of oxide when in contact in case where the Emf is extremely low + yet at higher Emf it will conduct by static may act as a Branly Recvr with telephone Possibly a weak current in shunt with telephone it would when rapid alternations come cause conduction take place + Local current would pass through telephone possibly a flat pen of mag or two decks worked a la Motogh would answer using Magnesium —

49 Possibly a condenser of extraordinary capacity could be made with Aluminum or Magnesium foil resting one on the other in high vacuum. The oxide serving as the dielectric. If the capacity is directly as to the thickness the C would be immense. possibly foil wont do but ground buffed disks essential.

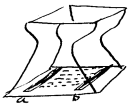
50



Possibly a Branly could be made thus as above. Levelling would make pressure more or less.

Spark Ethric. Dark box

57



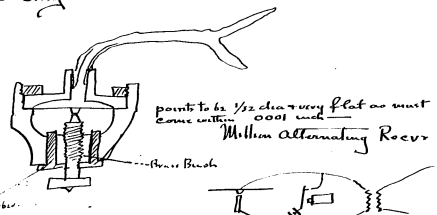
a + b strips gold plated surface between say glass photo graphite dusted between, possibly hydrofluoried surface better + graphite rubbed on.

52 Wonder if storage battery be made iron wire — 1/4 dia wound with wire like mag iron 1000 ft long.

53 Tried paper soaked in strong Sulphate Ni then dropped in KOH, with 4 Bunsen only got poor mark as chem recorder think there was insufficient Ni hydrox stirred be heavy coated or solid cylinder It could be mixed with Magnesia hydroxide dried to a powder, compressed + then wet with KOH,

54 — Try semi-dry hydroxides pressed in H press for Emg —

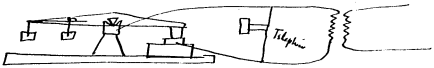
55



Relay shows when in contact + by self induction stops rapid alternations also contact et changes air gap —

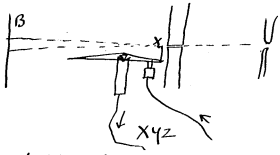
possibly points of Mg or Al. might work in actual contact, possibly the rapid alternations might cause the local et to circulate might try in place of relay a galv or telephone, Also oxidized points Fe Cu Pb Zn Cd Sn possibly Mg for one point + Fe for the other etc If actual contact will do the most would be practicable,

55 Cm What may be a better instrument if result is to effect current + not make a sound is this



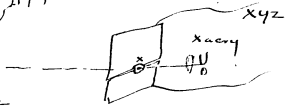
possibly a very fine point is required to come the effect, of the alternations

56



Movement of X 1/1000 000 inch moves B .005 when 4 ft dia Hole about .010 inch long
or use point

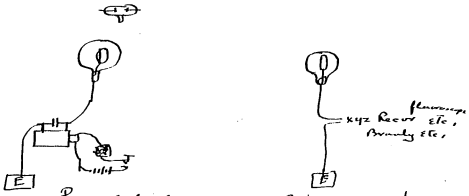
X crystal to refract by XYZ



XYZ passing thro Cryst bends ray—

57 Possibly an X ray tube is the only efficient way of making good contact with the Ether, free of matter space telegphy might use it, it would be etherically non polarizable so to speak and many poles would not be essential just one pole + a bulb,

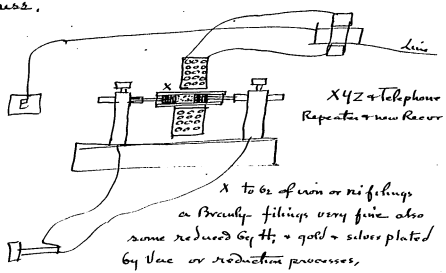
57 Continued



Possibly bulbs must be exhausted beyond X ray stage if beyond then X42 Recvr would be necessary not Brauly or fluoroscope.

58 To make solid blocks of crystalline substances powder them up and moisten very slightly, with concentrated solution of the substance, then subject to hydraulic pressure hot, experiment to get them clear Try large crystals and crush in mould Also dehydrate the crystals + then moisten with H_2O + press.

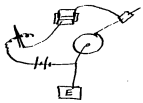
59



X to be of iron or ni filings or Brauly filings very fine also some reduced by H_2 + gold + silver plated by Vac or reduction processes,

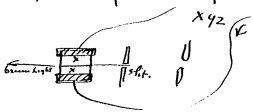
thinks it will auto decohere,

60 For sensitive chemical paper device thus.



Use of a good inductive magnet & a weak current which can be controlled by a resistance & have the current in such a direction that it tends to make a mark but does not quite do so, the incoming current then has not the same work to do, this should enormously break down the res or polzn & make chem paper much more sensitive,
With KI + Pt or Te point the constant current is to this what the perm mag is to a telephone,

61

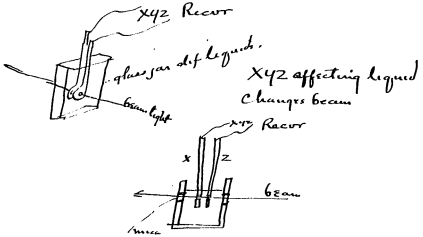


× × ground Crystals, X4Z refract & move beam——

62 Perhaps thermo couples which give no current when heated might give X4Z Use X4Z Recvrs & test those on hand, Emgraph, telefone etc.

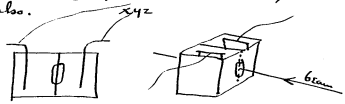
63 If thermo good couples are a question of the combination of an acid forming Element like Sb with a basic forming Element like Zn & high atomic wt is required then Wo with Mg as an alloy or Wo with Al Zn etc be good.

64



possibly beam should have shutter & be vibrated
" X solid to absorb beam.

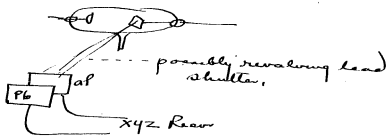
Try for liquids Ether, Conc H_2SO_4 Glacial Acetic, Trichloroacetic CS. Anilin oil, Cassia Sassafra Benzol Mirbane, Distilled H_2O Alcohol Et & Me Chloroform Kerosene Paraffine oil – Butter of Sb – Etc. Try Conc soln of salts, using electrodes same kind metal both sides to eliminate Elec repeat absorbers of light & radiant heat.
Try X rays also.



Beam passes junction either in one liquid or the other seperate by Mica also animal membrane.

65 In X ray tubes make several with dif residual gases left in make one filled with MgO with Reg Electrodes. make a very small X ray tube ½" size,

66



66 Platinocyanide of Ba dissolved in Collodion or Gelatin + dried Crystals will be very fine and showed quite very sharp photos for X ray

67 Bismuth oxide combine together + one double oxide loses O at 130 Cent. possibly can be used as sub for Ni in storage bat

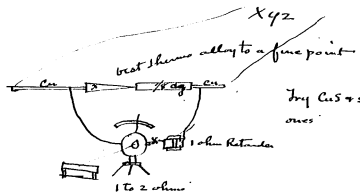
68 for thermo Alloys of Se + Bi Zn Sb etc

69 Collect all the Platina in lab for making from the scrap the fluorscq salts + light salts,

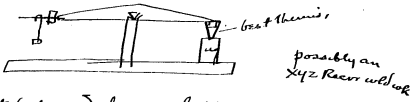
70 Inexpensive Fluorescens can be obtained by laying the round mica disk flat, + pouring a few drops of the concentrated solution on it + let the H_2O Evap in most cases the crystals formed will adhere

71 Prism. of fused material can be cast between plates of glass at proper angle;

72

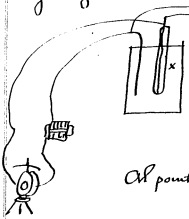


or at X a vibrator + very sensitive telephone of very low Res



almost balanced to give light pressure

73 Platinum will not amalgamate because there is a very thin layer of something on it. Think it could be used in Brauly by soaking charcoal powder of right size in Pt Chloride + heat in Hydrogen



x glass tube with the smallest possible point exposed to liquid pt also Zn Zn + Sul Zn + other non polable conditions

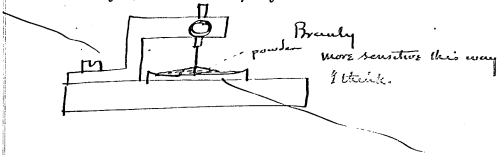
At point 1/4 of $\frac{1}{1000}$ exposed plate large A.P.

74 It is probable that a photo positive could be taken direct by making a dry plate with emulsion of Black hydroxide of Ni; then expose to light the light may not be sufficient to reduce it to $Ni(OH)_2$ but by using a developer not strong enough to reduce $Ni_2O_3 H_2O$ to $Ni(OH)_2$ would be strong enough to reduce the part acted on by light, (ie) light + the developer together could do it. The $Ni(OH)_3$ is endothermic & as Voltage is as good as AgO it ought to be just as sensitive providing a proper developer could be found, it would be cheap.

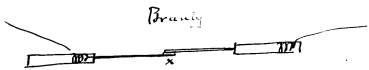
75 Dry plates soaked in dark in solution oxalate Lithia, dried, + then used to photo by arc light showed be very sensitive.

76 Try a sheet with crystals on, expose to arc light 5 minutes. then insert in dark box with photo dry plate + a pattern see if photos also see if goes thro opaque paper.

77



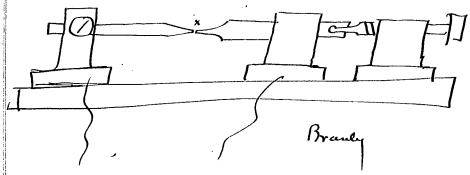
78



x wires have mica bet + whole smoked with Lampblack.

79 Darkbox Ethric,

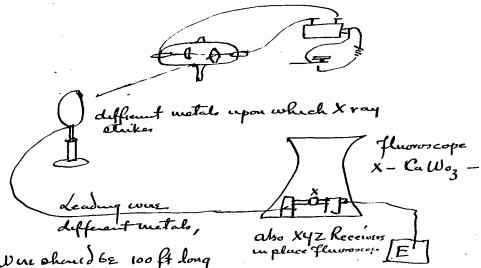
X smoked across with Lamp & Pack



80 – Make 2 or 3 oz for Expmt of crystals by $CaWO_3$ fusion method All Tungstates of metals Molybdates & others by fusion + NaCl –

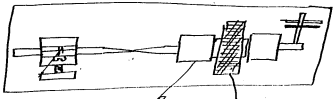
81 Make Sulphides by fusion process of Ba Sr Ca Mg Be Thoria, Zr All Mg etc. for phosphorescence Expmts –

82



Wire should be 100 ft long to get outside influence of tube.

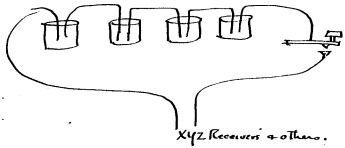
83



Ivory insulation, This is to be made on hard rubber base made very fine & accurate to go in a dark fluoroscope box with hinged bottom & also to be used under a Microscope in a dark room —

84 See if X ray explodes Iodide of Nitrogen, also if Ethereal does it acting on Brauly.

85 Generators of XYZ —



Use Carbon Electrodes for one & one of following for the other
Ag Cu Zn Sn Pb Fe Ni Sb Bi Co Al Mg CuS.
Te Pt Au Cd Pd FeS Fescale Cu scale
Use following solutions
Conc H_2SO_4 CS ditto with extra Sulphur dis
also following dissolved in it Oxalic A, Chromic A
Acetic & Sulphates Sol Therin
Next Solution Chloroform — ditto with Rosin ditto with
Bromine Iodine, S. Pyridin Aniline Ferric Chl
$HgCl$ Key KSulphite & Sulphide. Picric A
Trichloroacetic A also all Organic radicals with
metals & Organic bases

85 Cont Another liquid Glacial acetic acid with following dissolved in it Chromic a. Br I HgCl $FeCl_3$ S pyridin Aniline Trichloroacetic acid, Key Oxalic a, HCl, Nit a, phos a, add more

Trichloroacetic acid with following dissolved in it Br I S $FeCl_3$ HgCl K sulfite KS CrO_3 Key Oxalic KOH, HCl nit a,

Then Ether with $FeCl_3$ HgCl. Br I. S K sulfite. CrO_3 Key Oxalic KOH.

Absolute Ethyl. with Br I S K sulfite, KS Mirbane Picric acid, CrO_3 Key Aniline, with Vanadate NH_3 + Cu salt, Oxalic a KOH + others.

Benzol with Br I S K Sulfite. KS HgCl $FeCl_3$ Mirbane Picric a CrO_3 Key Aniline Cu + Va oxalic KOH.

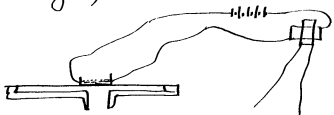
Pyridin with all the above
Liquid Chl Tri —
Acetone
Aldehyde
Chloral Hydrate
Phenol + others
probably best will be CP Benzol + dissolved Stuff —

86 Perhaps Bichromatized Gelatin will have chromic a reduced by XYZ or Eho + that the oxdzd gelatin is not deoxdzd by Ct if so it would act as a substitute for Bromly with a film $\frac{1}{1000}$ inch point slowly moved 1/2 the alternation doing work —
Think Aniline black by Electrolysis is not reducible. it is formed by current but after formation is neither Oxdzble or reducible
also possibly ferrous oxalate + Chl Ag or a dry plate film — The Hertz wave would have one half raise Fe Oxlate up to ferric ox + the other wave could not reduce hence a record.
The recording point would have to be fine + the surface perfect.
Try Aniline Hydrochloride see watts 2nd Sup. 77
Sulphoacid of aniline pyrogallic with
Nitrite K — O of K oxdza pyro + alkali free
use 2 pens one in line with the other,
Also pyro + a salt of lime — free lime causes pyro absorb O blackens also a K salt
try paper tinted with all the Aniline Colors + platina pen to see if any Color reduced by Current or XYZ.
To keep recording surfaces just moist enough to Conduct + still appear dry use Chl Li CaCl, NH Nitrate ZnCl MgCl use in water little NaCl Chlorine will react to give O.

87 = Break off 1/2 inch piece of the country rock collection I have powder + put in reg chides for fluorescing Experts,

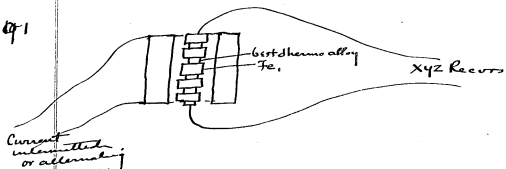
88 Organic liquid battery.
Liquid base Acetals
" Acetic acid in which are dissolved the hydrates of the metals – alkaloids + organic bases Chromic hydrate dis
All deliquescent salts soln Alcohol.
also Nitrates fused CaCl, Dichl Sn Baryta.
[Sesquichl Fe Protochl Fe Nit Ca + Proto Mn combine]
Try the Ethers Sulphuric Oxalic etc.
with dif chemo dis.
Also Chlorinated Hydrocarbons with dif Chemo dis

89 ~~[illegible]~~
A bar of iron held against a grindstone + grasped in the middle + at the ends Keeps cool in the middle but so hot at end cant hold it, investigate,

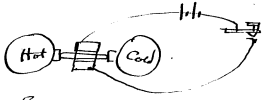


90 – Telephone
Use silver between Electrodes just put enough battery or Emf on to cause Branly to cohere make Current or rather Emf adjustable,
On talking each vibration decoheres + battery recoheres + so on it should be very loud,

91

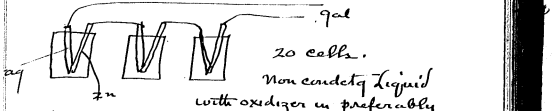


92

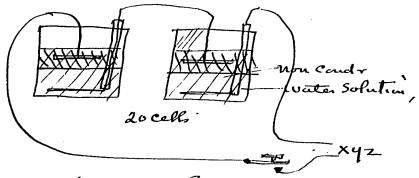


See if any def of current is off or on coil,

93

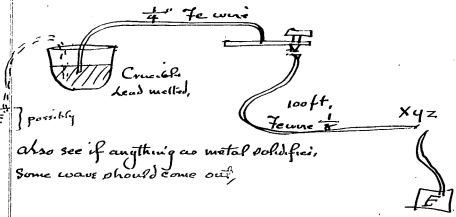


94



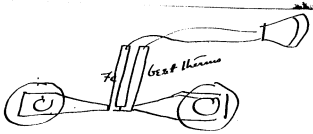
arrange Electrode so the one in non conducty is very near the Conducty Solution,

95



also see if anything as metal solidifies,
Some wave should come out,

96



Big mag see if any changes when mag energized

97 Organic liquid Battery
Chloride Sul ditto with 60% S dissolved.

98 Sulphur Mon Iodide heating S & I together
Even under water solid, melts 60 C.
probably soluble in Organic liquids

99 Crystalized or metallic like Selenium probably act like Tellurium as a pen point on Chem paper

100 Possibly in Organic liquid bat grids of Fe & Ni could be used no oz could make cheaply

101 Boron Nitride heated in a flame fluoresces with a bright greenish white light

102 Iodide of Methyl good for Organic Bat its mfd on large scale,
Methyl Sulfite normal) stable liquid
" Sulphate "
Methyl Sulphuric acid no odor syrupy stable forms salts, sol Methyl alcohol.

102 Cont, Nitro methane heavy liquid weak acid
Salts very explosive
Lead Methyl liquid, unaltered in air OK.
Tin Tetramethyl liquid stable
Iodoform CHI_3 only 0·26% H good to
dis in liquids
Chloroiodoform oily liquid $CHICl_2$
Formic acid liquid,
following salts combine with anhydrous
Ethyl, acting as water of Crystzn,
$LiCl$ $CaCl$ $MgCl$ $NiCl_2$ Mg —
Na Ethylate, dis Na in alcohol,
Ethers are the oxides of alcohols.
Ether dissolves (not acid ethers) S P I Br CrO_3
$FeCl_3$ $HgCl$ $AuCl$ $PtCl$, Seul other Chlorides
+ Iodides + a few salts,
Ethyl CHl_3 Iodide + Bromide Sulfite Liquids stable,
Oleic acid, glycerine with Chemo dis in it,

103 Scheme friction induces P or Neg E in powdered
material for instance Rosin + Red Lead, one
becomes P the other N If mixed & blown against
two bulbs one is P charged the other N.
Rosin will come on one Pb on the other,
there is thus a perfect seperation, Try 2 bulbs
or balls on glass rods one P other N.
+ Rub or shake some Sunderland Conc see if
Phos is made P or N, Orz sepn scheme S.

104 It is stated that rubbing a puncture of a
thermos gives a current that ceases the
moment Rubbing ceases + is not due
to heat, but to molecular vibration see about it,

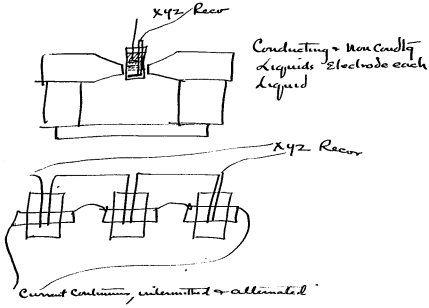
105 Arsenic + Sn Chlorides liquid non-conductors.

106 Organic Liquid Bat,
Chromium Oxychloride. Liquid, sometimes called Chlorochromic acid, Mobile Liquid boils 118 C Sol in acetic a.
Molybdic Di Chl Sol alcohol + Ether. also Pentachl Mo.

107 Vapor of Chromic Chl passed thro red hot tube gives violet prisms of $2Cr_2O_3 + CrO_3$ which are Magnetic Why ?.

108 Organic Liq Bat, Hexachl Tungsten Sol CS.
Uranic Nitrate Sol Ether

109 Tungsten Bronzes conduct well easy made make pound Each for Exput telephones, XYZ & otherwise.

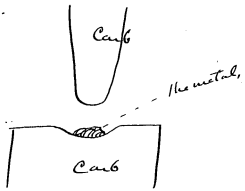


110 Organic Liquid Battery.
Tetrachl Sn thin fuming liquid mixes all proportions with Br + CS.
Tetraiodide Sn Sol CS Absolute Al, Ether Chloroform + Benzol. Tribromide + Triiodide Sn Sol CS.

111 Phosphide Tin Sng P. Coarse crystalline mass like cast Zn Conds, try thermo,
Vanadium Di Oxide V_2O_2 metal like, Conducts E. Try telephone + thermo,
Vanadium trioxide V_2O_3 in powder pressed together Conducts E.

112 Obtain from Foote or English lot Rock Salt + cut plates + lenses, prisms,

113 Here is a chance to test by eye + Photo plates all the slides with monochromatic light from the different metals in arc light Especially Violet metals, giving most intense lines in Blue, Green, Violet + Ultra,

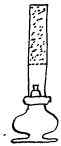


It is possible with say Mg that with very strong light of one refrangibility will find specific crystals that will be in unison + fluoresce strongly which might not fluoresce at all with a weak line of the metal,

114 Buy some dry plate Emulsion in Gluck bottles for Expt.

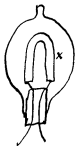
115 See Watts on re Fluorspar, perhaps a magnetic or Electric stress continuously applied will cause continuous phosphorescence by heat + thus give a fluorescent Lamp.

116 Tourmaline Cryst becomes Electl by heat? one end P other N. its Electrifier must have very high Voltage, possibly a mixture of fine Tourmaline Cryst. + a substance which will fluoresce or phosphoresce by E when mixed + heated would give Light

117 

Long chimney filled with phosphorescing crystals on sides phosphog by heat below red,

Kerosene

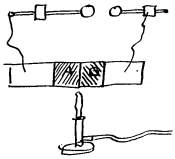
118 

x Thin sheet metal coated with crystals of phosphorescing matter phos below red heat, or foil of iron or CrCo alloy coated with phosphg crystals,

119 Test magnetism different metals at a red or white heat with pointed poles by mag using wires + bunsen burner, possibly some metals might become magnetic a heat higher than normal.

120 Test best thermo alloy cooling slowly against pouring in mould see which gives best voltage

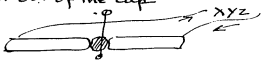
121



Have an idea that pressed blocks of precipitates like Oxalate of Calcium which become electric by heat, or powdered crystals in blocks put together + coated with metal and heated at juncture or all over one giving Pos the other Neg should give plate glass machine effects especially if a number are put together.
If heating all over will do then disks can be used.

ditto sealing wax
sulphur etc

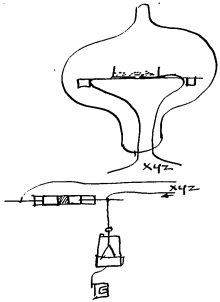
122 Dry Oxalate of Calcium when stirred with a glass or platinum rod becomes so electrical it can be lifted out of the cup



piece Oxal Ca between points by XYZ passing excites Oxal Ca a pith on thread attracted,
See Special book for substances Elec by heat,

Powdered Tourmaline, Oxal Ca

123



Like divided cup on Iceplume Ag powder Vac when XYZ or E Comes coheres.

Mixture Oxal C + Ag powder for Branly

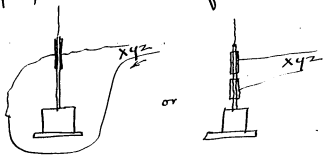
124 Condenser Mixture Oxal Ca alone as dielectric or mixed with Rosin.

125 Find a fused salt that will dissolve Oxalate Calcium

126 Make complete set Oxalates, Double Oxalates, use Oxalate Ca as impurity in other fluorescers

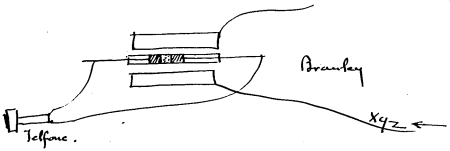
127 Make a very high note whistle and arrange that air vibrations pass a narrow passage between two insulated disks. Use instead of Branly The E or XYZ waves serving to change the quality of the note. This should be very sensitive use listening tubes

128 Make a capillary glass tube through which Acetylene gas passes and has a fine needle like flame



Tin foil around glass tube, XYZ electrifies or changes gas + varies flame

129



See if coming + going of lines of force cuts Ag particles makes a local current + the whole attract instead of action of current direct

Organic liquid storage Bot,

130 Glycerine $C_3H_5(OH)_3$ Alcohol of a triad Radical

Ferric Chloride seems to be a general Organic reagent Its soluable in many Organic liquids acts as Oxdyr

Ethylene Oxide forms the link between Organic + Inorganic Chemistry Its neutral yet a powerful Base Unites with HCl as strongly as Ammonia, Its an ethereal liquid

Boiling 14 Cent $\begin{matrix} CH_2 \\ CH_2 \end{matrix}\rangle O$

Diethylene Dioxide $\begin{matrix} CH_2 \\ CH_2 \end{matrix}\rangle O\,O \begin{matrix} CH_2 \\ CH_2 \end{matrix}$ boils 102

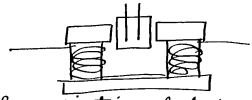
131 Crystalize a rapid good crystalizing substance with needles in a very strong moving magnetic field, have it hot, let it cool off + crystalize Notice if any different arrangement of crystals from a duplicate solution not in field but made at same time under same conditions

Also try 3 or 4 drops on hot glass, microscope slide in field + out (Magnetic) then can examine closely + try great number of substances rapidly Use pointed pole + big Magnet,

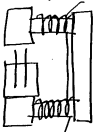
Could put few drops on glass with a crystal or so heat glass + dissolve crystal + then let is evap and crystalize in + out of field —

Might try in + out of arc light beam also X Ray —

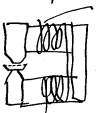
132 Organic Storage Bat,
fused chlorides are decomposed by current, no water therefore say HgCl dissolved in an organic liquid with Hg at bottom cell and a grid of Carbon with Graphite mixed with a trichloride which goes to a Pentachloride when charged, this is only an example.
The dissolved active material acts as if fused
The Organic liquid is simply another way of fusing (or) dissolving it so molecules are free to move. Strong solutions should be good
Conductors even when organic is good insulator
Its not necessary organic should dissociate because there is no dissassociation? in fused Electrolytes, The main thing is the Electrodes to bring about conductivity



possibly combinations which do not conduct in a powerful Magnetic field — by orienting the molecules —



It is possible that light + X ray fluorescers Crystallizing in a powerful magnetic field might fluoresce different or gain or lose it altogether



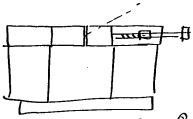
Iron dish with paraffine Coat, Thin for crystlzg

133 Select all the good X ray fluorescers and recrystalize many times, also recrystalize from every solution they are soluable in,

134 Make Tungstate Calcium using instead of NaCl, Every other fluxing salt that will work & produce cryst, may get CaWO4 more sensitive than platinocyanide of Ba —

135 Crystalize Light + X ray fluorescers in strong static field,

136



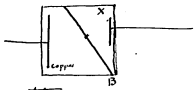
Big magnet with one part of pole piece adjustable to form a spectroscope slit also put a spectroscope slit in Magnetic field Concentrad & see if magnet affects lines of metals —
It may make a difference of what metals slit is made of

137 Try X ray fluorescers in a powerful Magnetic field also 1000 Volt constant field, also Cold & hot environment,

138 Make by fusion process Uranates of all bases for fluorescers — rares & all. also melted Uranates by water crystlzn.

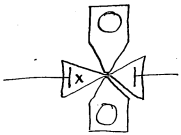
139 Make liquid cell with small spectroscope see if powerful Magnetic field changes the absorption of different parts of spectrum of different liquids Try static field, also try solutions with same electrodes & solutions of their own salts when powerful Electrolytic action is going on Try a large number also alternated fields.

140



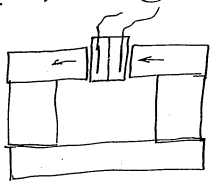
B insulating partition, with spectroscopic slit 001 Electrode in X side polished silver, Liquid is a prism, other Electrode polished Copper or silver, electrolyte Acetate Lead, or $CuSO_4$ – pass current & Phenol by Electrode & perox Lead with show Electrolytic spectrum, or lines, if any result try mixed Electrolytes & poles of alloys

141



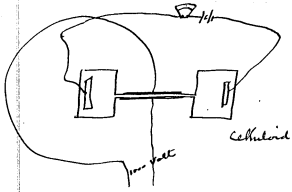
X is double cell with very narrow slit connecting

Whole placed in field use electrodes with own salts

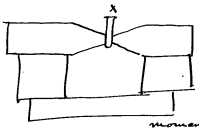


also divided cell with slit parallel to Lines of force

142

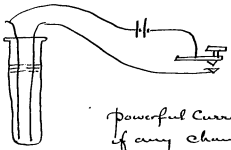


143



x test tube try chemical Color reactions note any change in Color of reaction, also if any change at moment of reaction in the magnetic lines, by galvr + Induction,

144



powerful Current passing see if any change in chemical Color reactions.

145 Put Brauley in cone mag field see if better or worse

146 It is possible some of the crystals which carbonize without melting if carbonized slowly and then put in Lime arc furnace and heat to a terrible temperature by radiation might go to Carbonadi, Especially those which crystalize in the right system,
Also Anthracite + Carbon from Sugar might do the same if pure + free from Fe which Acheson says tends to cause formation Graphite, Fe + other things, Cl Carbon is what is wanted,

147 I remember when I first subjected things to high temp in arc I got iron that gave wide manstande figures also feather crystals with iron, possibly metals mixed or with chemicals might at very high temp change; Try iron kept at high temp by Elec furnace for long time & then analyzed for other Fe metals & Co Ni ___

148 It may be that a disk of rubber revolved very rapidly between poles of Cons Magnet having a tube of hot liquid which crystalizes when cold wound of revolved that cold some phenomena might occur Try fluorescence.

149 Try with isomorphous crystals all the solutions that give crystals in the same system make a mixture & get a compound crystal, also keep saturated solns seperate form & crystals then remove the crystal to the next solution & so on till compound crystal produced. Try for phenomenon Xray & fluorescence, phos;

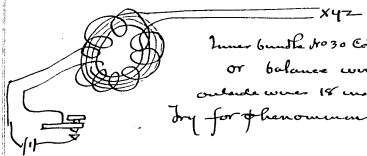
150. Perhaps metals deposited Electrolytically might act quite different as thermo Elements as their crystaline arrangement would be different, possibly best thermo alloy could be deposited & have the value increased possibly depositing Ni Co Fe in powerful magnetic field when worked regular the result is heated this way it is formed without heating hence results as thermo may be entirely different. possibly tin lead silver & other deposit of crystals formed with current of great density could be pressed in form.

151 It is possible that a boiling saturated solution of a fluorescent salt if suddenly poured into a liquid in which crystals are insoluble which liquid is 10 deg below zero or over a chilled Copper plate in thin layer so it would Crystalize instantly that the crystals would be more unstable & be better fluorescers

152 Try all the Ni Co Fe single + double salts Crystalized in Conc magnetic fields + Current stress, X ray field —

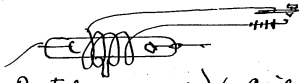
153 Bore out a large Chemical crystal, wind as a ring transformer with fine wire, get kick on galv, try many crystals,

154



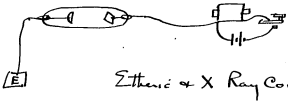
Try for phenomenon

155 Make X Ray bulb one inch dia 6 ft long see phenomenon



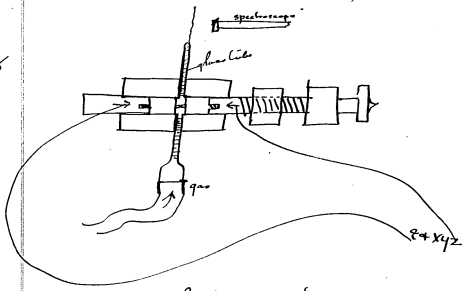
156 X Ray Ray tube surrounded by Coil powerful Current, also ditto in Mag field, field + Current, also in Oil, 3 together; Try further Exports X ray tube in Oil,

157



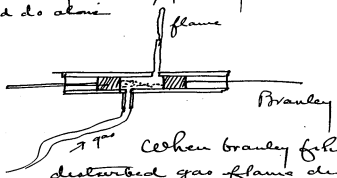
Etheric & X Ray Coil, notice phenomena.

158



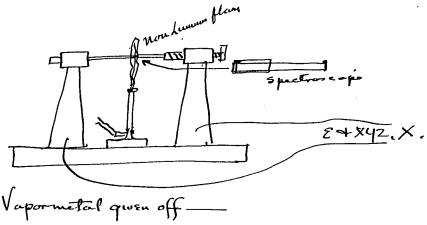
points made between glass tubes formed of unmagnetised points or metal points which when E or X Y Z comes jumps the space between points say 1/4 of /1000 such a vapor of metal carried up in gas gives spectrum in flame.
possibly two fine points of a conducting sulphide of metal, giving strong lines or alloy with lithium Na etc. This ought to be marvelously sensitive, possibly Te or As would do alone

159

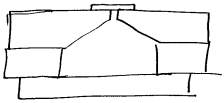


when brawley filings disturbed gas flame disturbed.

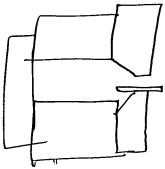
160.

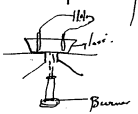


161



See if fluorescing crystals still fluoresce or changed Na Or non fluorescers become fluorescent also phosphorescers. Plate glass Crystalizing Solutions heat + Cold — Use non plate. Crystalize on that also Cu plate, in light + darkness in X ray + while Current passing liquid. When crystlzg + all together,



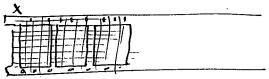


162 Most Nitrides of metals Conduct E. make all for Thermo,

163 Mercuric Methide has highest specific gravity of any known non metallic liquid, 3.069 — flint glass floats on it, Its a powerful Alkaline Base,

164 Sesquioxide of Cu Cu_2O_3 mixing Chloride Lime with Nitrate Copper beautiful rose Colored substance, Its the Calcium Salt of Cupric Acid —— Gobelin made for Cu Bitting.

165 Strip for Kinetoscope. I find gauze cloth held close to strip while projecting does not effect the picture,



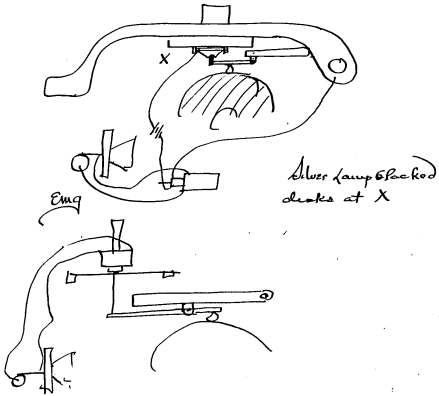
X 0025 steel strip where picture go so punched out, feed holes punched in — gauze cloth stuck on, strip laid flat + Gelatina silver emulsion run over strip + dried then printed on from Negative taken by reg Celluloid strip, ought to be 3 time Cheaper ——

166 X ray phosphorescing material might be mixed with Dry plate Emulsion + print itself ——

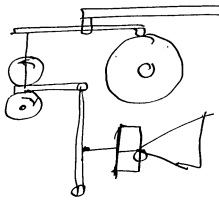
167 Make all the precipitated fluorides & then bring them to red or higher heat they may fluoresce as precip $CaWO_4$ does when heated & not before.

168 I think there may be lots of precipitates of chemicals that can be pressed to tough cakes by hydraulic pressure say neutral precipitated stearates of metals insoluble phosphates borates fluorides sulphates oxalates that are gluteinous or amorphous It is possible that very finely divided NaCl could be pressed into a transparent block

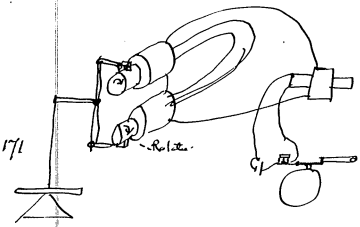
169 Phonograph Mch 21 1902.



170

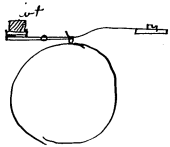


171

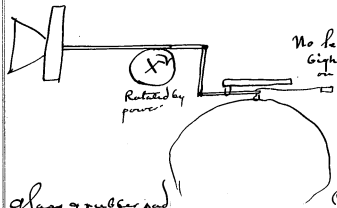


phonomagnetic

172



173



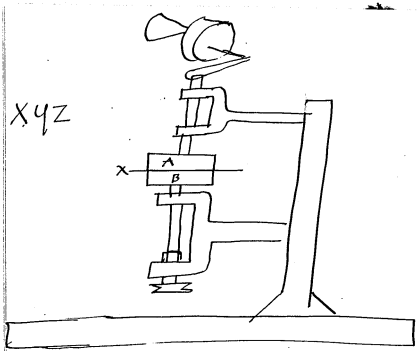
No leverage but mechanical Light produced by Rotated disc on X 500 to 1 inch. when a pressure on 1 by sound wave make a pressure of 2 or more on X & then amplify sound wave

glass & rubber pad, allow one impedant glass out slightly.

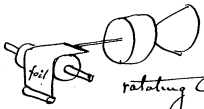
mechanical bite.

174

XYZ

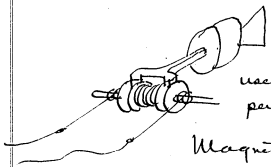


A B metals lapped flat. X dielectric possibly ? magnesium disks lapped flat, only oxide surface, possibly two lapped surfaces of different metals perfectly clean when rotated might hug when a current passes possibly hug on going from metal A to B & let up on going from B to A. films could be used when large field for Exmpt with this that impossible with Chalk Malogh,



rotating Cylinder with different films on ferro cy Cu etc,

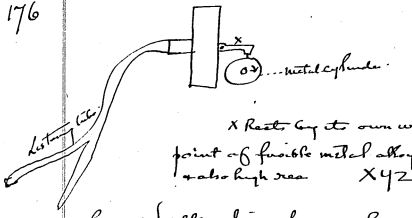
175



use only one leg
permanently magnetize it

Magnetic Matogh —

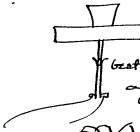
176



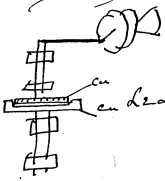
X Rest by its own weight.
point of fusible metal alloy also cylinder
+ also high res. XYZ receiver,

for rapid accumulation - freezing Res of alloy
should be very high at point to make high R.

177 Telephone,

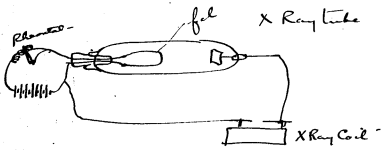


best Nickel alloy we have try
against



178

179 Crookes in Vacuo.



Notice phenom

180 Glow Lamp by oxidation, fill 3/4 full of mixture of MnO_2 or PbO_2 + magnesium powder etc, heat, until reduction takes place should glow in high vac if dry—
possibly Fe by H, + PbO_2 or MnO_2
also Ferric Ox from Oxalate + Fe by H,

181 Pass City gas to Burner in photometer & pass sparks through gas before burning see if enriched &c also Sparks with Carbon points.

182 Will a Soap phenom soap bubbles mixed with Fe by H go up in air + follow the Earth lines or a magnet in room—

183 Andalia

put in powdered transparent 10 mesh phosphorescing materials for fluorescent lamp notice best point of vac with small sparking Coil—

184 To a hot saturated solution of NaCl. add AgCl a double salt formed, which crystalizes in cubes, just like salt, these crystals blacken in light, make about 20 kinds with various proportions of AgCl. for X ray — phos & XYZ

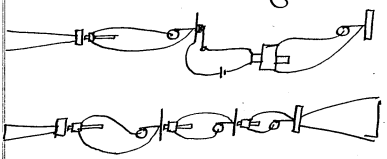
185 Sulphides of metal can as a rule be fused in all proportions with metals, hence here is a new field for more thermo alloys possibly phosphides arsenides tellurides, antimonides nitrides, can be used in this manner.

186. Add Monochloride of Copper to boiling saturated sol of NaCl. in various proportion. & Crystalize for X phos & XYZ.
ditto recently prepr. tungstic acid,
also Oxalate Lithia,

Chl	Cu	all with NaCl.
"	Pb	
"	Pt	
"	Ur	
Nit	Ur	

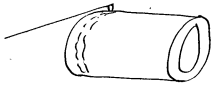
Draft -

187



188 Try one with metals records & hard carbon pencil point bat coil & Bell reader may work —

189

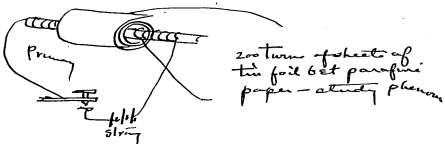


or Lellmann point

Cylinder say of plaster Paris soaked in Nitrate lead telephone & induction Coil Lead deposited on N & radical on mandril reproduce by friction, or current from platina point Cylinder smoothed by Daphne oil & polished after.

190 For coating a cylinder for Chemical recording try glue glycerine & the Chemical to be used Coat Cylinder hot think possibly can turn off with saphire but poly not necessary possibly Gelatine & Varnish of shellac of Soda with Chemo mixed will answer — for Te pens & others possibly Pens S Alcohol + H_2O Varnish will do for Te zt,
Tragacanth, Iceland moss, agar agar Emulsin with the Chemical, gum Arabic Albumen Gelatin, Solution Cellulose in $ClZn$ Mandril dipped in + then in Ethyl, then washed & impregnated with the Chem & Dried see Gwa Solution Amyl collodion then boiled sulphiprate Ammonia to reduce. Reg size moulded Record Cylinder pears soap from hot alcohol This should make a beautiful recording surface if whitened by adding some light precip organic chat or white,

191 -

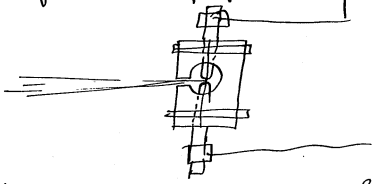


192 Purchase a good Tesla Coil —

metal cylinder a small piece of porous material in opening can try solutions also small crystal for Emg action quickly

193 Get something that makes a constant noise listen to it in quiet room at greatest distance + at shortest distance thro obstacle Then take it into noisy shop + do same thing This will prove if noise helps deaf people or if due to other people raising their voice,

194



to test all fluorescens + etc XYZ of arc light Lime Carbon Chamber - vary he at when testy fluorescens ultra Etc

195 Make good X ray tube only coat platina with Lime glass see what change makes in quality of ray —

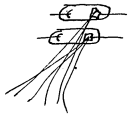
196 Make Aluminium Condenser of thinnest sheet Aluminum obtainable interpose say Mica sheets see if charged when X ray passes or if when chgd Electrically X ray affects or when X pass Condr will affect another X ray tube by discharge

was Al + next sheet Cu - perhaps Condenser would rectify -

197 See if one X ray bulb having it plates cupped & focused through the air to an adjoining X ray ~~tube~~ platinum with flat sheet, Vary this Experiment so the spot where it strikes glass is arranged so ray will go across air to another bulb —

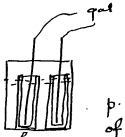
198 See what one X ray bulb does to another both active

199 See if rays of one bulb is increased in power of penetrating by adding a second bulb so its rays are added to the first



200 Cellulo'd cell with oil + X ray tube in -

201

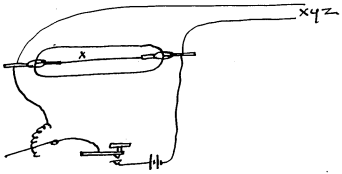


p. porous cups one with crystals of an acid other with crystals of an alkali also one with Soda + other with very quick dissolving crystals Soda in outside solution Idea being that going from Crystalline form to liquid form will give or absorb Energy try those crystals that give Cold on dissolving in one cup and heat on dissolving in other cup also a neutral Crystal giving neither heat or cold against those giving both h + cold

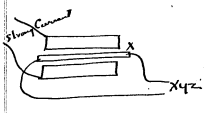
202 Fused Electrolyte Thermo Experiment.

Copper & Iron, in iron crucible — use Chalk ZnCl + def Chlorides, bromides, Key alkaline salts Borates phos Also Nickel Crucible Ag Crucible, fusible glass, enamels etc see Voltage + of Electrodes attached,

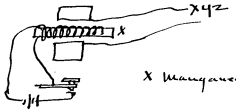
203



X non wire in Vacuum, brot up to recalescence point + then raised and lowered see if molecular wave brought out, Vary —

204 

X manganese steel are of molecular waves sent out,

205 

X Manganese steel + other metals,

Becquerels order of power of Phosphorescence
1st Sulphides Ba + Ca par excellence —
2 Yellow diamonds. 3rd most specimens fluorspar
206 4 Arragonite. 5 Calcerous concretion, 6 chalk
7 Apatite, 8 Heavy spar — 9 Dried nitrate Calcium
10 Chloride Calcium dried, 11 Caly a large
number of Barium Compounds, Magnesium + its
Comb, also large number Organic, Dry paper
Silk, Cane sugar Milk do, amber leath,

207 New — Take X ray bulb exhaust till no X ray
vac being too high, now focus on it rays
from an active X ray tube adjacent,
this should break down the resistance +
should get X ray in 1st tube, then continue
Exhausting + perhaps can reach another
ray this can be carried further perhap
by more powerful Exciting tube or
several of them massed — If dont go
try Ultra light from Arc through quartz crystal
fused in tube,

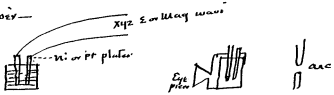
Also try bring it back by putting bulb in strong mag field also in CO_2 snow.

208 Make following X Ray bulbs with platina vane but cup Mag Of Zn Fe Ni Pb Sb Bi Cu Ag Co magnetite NiS FeS Grafite see any phenomenon. possibly with Co Fe or Ni Cup magnet might deflect ray –

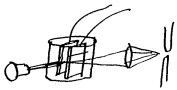
209– Place a NiFe storage or Elefande battery in field of mag see if C or Voltage affected, Try right-angle + parallell to Lines, Doubt affect NiFe storage Battery

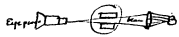
210 Air least least 1.00 + mica the most 5.00 Spec Induct Capacity possibly this is due to layers if so an artificial thing could be made possibly of enormous Capacity say dip foil 1st in Room in Ethyl then Hgll in Ether or ferric Cl. use solvent for one that does not affect the other It must be a question of layers + contact or discontinuity that makes mica so high + not to its Chemical nature hence there is a field here for investigation + the production of layers Extraordinily thin of materials having not contact as with mica, all that is required is dif solvents + material like water + a hydrocarbon. possibly there might be found a materials or materials that would be less than air

211 XYZ Receiver—



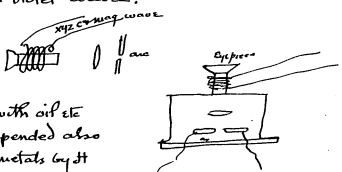
oil in which extremely fine crystals which float in the liquid When waves comes particles set themselves parallell or in such a way as to affect the light coming through – the opalescence is changed.





Even conducting liquids could be used Ni Fe grids + KOH, or Cu $CuSO_4$ Cu or Zn KOH Zn or Zn $ZnCl_2$ Zn Zn $ZnSO_4$ Zn Cd $CdSO_4$ Cd.
Crystals can be ground impalpable but preferably microscopic ones unbroken used possibly Hydrosols various organic liquids might be used.
This will be fruitful source of phenomenon. powdered magnetite or precipitd magnetic oxide Metals reduced by H suspended in gelatin or Hydrosols possibly cell should have quartz entrance + Exit for beam to get ultra violet waves.

211

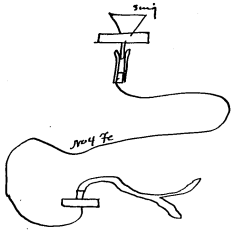


Tube filled with oil etc powders suspended also mag oxide metals by H waves cause particles arrange themselves + change the opalescence possibly better than Branly for Marconi + fine for XYZ.

212 The sound produced in Fe by magnetism is very much stronger if a wire is used + a current is passed Use powerful Current + several feet of wire + attach to XYZ Recorr use metallic ckts

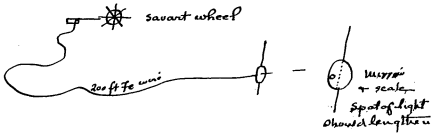
213 According to Mitthersen Cobalt is next to Bi as a thermo this combined with best alloy gives more voltage Co can be got cheap it shows there is a good field in high Melting Pt alloys
Fe is 179 against Sb 9.8

214



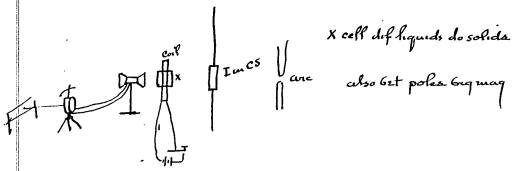
See how far can go

215 Guyot, Guthrie + Schellbach observed phenom of attraction + repulsion existed on suspended particles by bodies vibrating in proximity they say nothing is known as to cause.



216 Iodine in CS_2 is impervious to all visible rays from an arc light but pervious to radiant heat, only a very slight absorption taking place. This is ideal for trying the slides with fluorescent crystals for fluorescence + photography also for speed photo plates sensitive to radiant heat. for monochromatic heat rays which might perform work when plain arc lamp would not, also for low temp radiation like from Sulphur phos, Hot Zr Lamp fil 32 CP at dif temps, could arrange it in dark room the thin cell of I in CS_2 being the window + rare the outside,
Melloni used a Thermo pile + got advancing result of heat absorption possibly ray might be absorbed or altered by the character of the metal of the thermo, don't get caught. look out about the material of the jar for I in CS.

217



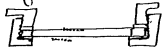
test of powerful moving lines of force will alter the nature of a liquid or a solid through which invisible radiant heat passes so as to affect thermo pile
make 20 Element pile new Geot alloy + Kelvin mirror q.
also Telephone in secondary + pile in primary —

218 Radiometer with Vanes of platinum also $CaWO_4$ on glass + then subject to X ray —

219 Is it possible to fuse a large crystal to a solid keeping its form although it originally had water of crystalization such crystal would be good for Export,

220 Is fused NaCl as a plate as good as a solid plate of rock salt,

221 Make some cells of Celluloid Mica glass gelatin etc that form would be circular like telephone top.



222 New Idea. Grids & cups of rubber, celluloid etc mixtures various materials with graft to flake pressed in cake with graft pencil to make contact and acid radical solutions etc

223 Infusible stearates of metals made into blocks by great hydraulic pressure ought to be valuable also mixed with powders & heated & hydraulicked may give some very useful compounds. Neutral Oleates Resinates would be cheap —

224 Perhaps large crystals Tungstate Na put in Vac & gently heated till most H_2O comes off then packed in charcoal or graft & heated to consolidate try other crystals may lead to something.

225 Possibly Carbonization of crystals like Sulphanilic acid Urica etc which decomp without melting might if heat to are Temp in absence of conditions which give graphite produce Carbonado, enclosed are, Collect from Watts substances that DWM. I have them all marked,

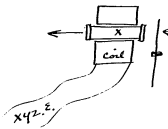
226 Remember the very elastic filements like rubber made by high temp linseed oil on fib of Bamboo, reproduce conditions + see if the Resin in Bamboo or Cellulose that produces the result, then expand to make flexible wood, paper, etc as substitute for Celluloid Rubber Etc this would be a valuable material Could not reproduce results

227 Mix hydrated Mn_2O_3 – or MnO_2 H_2O, PbO_2 OH with gelatin pour in sheets + heat The O reduced would Ox the gelatin + make it insol in H_2O + if flexible would be valuable, try BaO_2 CuO hydrate. Ferric Chl.

228 Tetrametaphosphate of Lead fluoresces slightly to X ray see if it fuses to a glass.

229. Try phono diaphm with small hole in it to permit a relief to the Condensing wave possibly 200 mesh screen with or without holes closed more, might change quality to the better, perforated disc with 10 or 20 1/8 holes in it but film of Collodion closing holes but excessively thin film

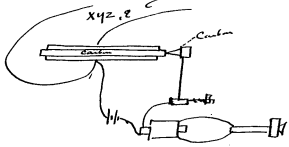
230



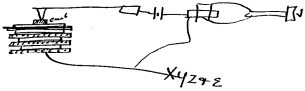
X cell with rock salt or other
Ultra non absorbs filled with
diff liquids also transparent
etix solids.

Theory being that bodies which absorb light or heat waves transform it into other forms of energy with diff wave motion or rate of vibration which may make local moving lines of force cut the coil X Revolving shutter causes intermittency

231

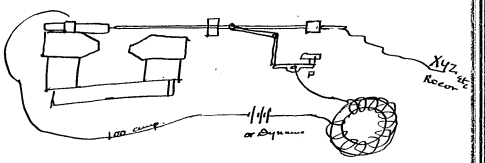


Theory that there is longitudinal Vibration



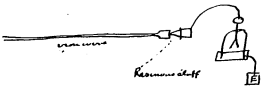
Layers of metals + thin insulating films
Capped by telephone Carbon or the Bauds style
with powder

232



A spark broken right in concentrated field to give pistol shot shot break. This explosion to traverse the iron & effect X42 etc receivers. Idea being to transmit high frequency sound waves in iron wire in water 100 or more miles. Leyden or Coil with balls of iron + wire used.
perhaps a sound resonator with molecular iron can be obtained this certainly should give a million a second sound waves. Wave length $\frac{1}{10}$" inch —
This frequency of sound wave on wires should cause attraction & repulsion strongly of light matter, perhaps at extreme end of iron will get attraction by electrification of air at surface this would make Brauley work

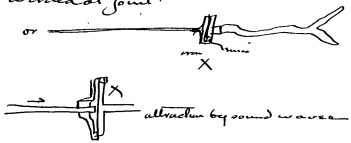
Receiver end of wire



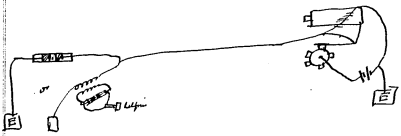
Phone

If vibrations of sound through a wire is 1 million sec the wave length will be 1/16" long a Brauly with wire extending into tube & faced with Ag the other plunger can be adjustable when 1/32 or 1/16 should set air in vibration & agitate powder which can be continuously electrified the vibration breaking ckt.

Can tune by moving ~~plunge~~ plunger. Iron wire should be welded at joint.



233 From the way phonoplex works in wet weather with wires on ground, it is possible that a bare wire 100 miles in water might transmit a millionth per second waves recog on a Brandy using discharge of big primary broken by air blast or magnet.



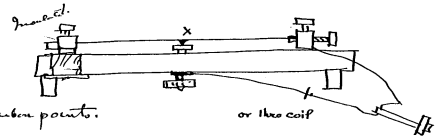
234 Didymium may be a good oxidizer in battery gives a perox which gives off O in acids or by heat,

235 In forming crystals, their form changes according to solvent from which they are crystalized, for instance $NaClO_3$ may crystlz entirely dif from KOH also fluoresces from dif solvents,

240 Make a few slides of X ray and Arc light fluorescen from solutions with a salt of the same "ion" also along solutions not crystalizable + not incompatable, and crystz at dif temperatures as there is marked dif at dif temps

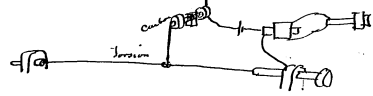
241 Sublimed Mercuric Iodide gives yellow crysts which slightest touch turns scarlet + extend throughout mass when crysts are touching or with a slight motion, This might be used as indicator for sound on iron wire or XYZ — also it might turn scarlet then yellow + back by certain forms of stress waves. Its a different form of crystaline structure that causes the change of color, hence being on the verge of change small energies should work it.

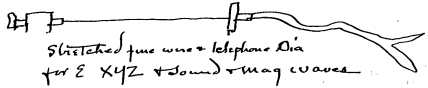
242 In forming large crystals large flat dishes should be used + possibly paraffined to prevent creeping



243 x Carbon points.

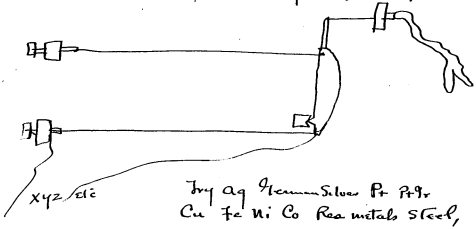
Stretched wires to detect XYZ + sound waves





Stretched fine wire + telephone Dia for E XYZ + sound + mag waves

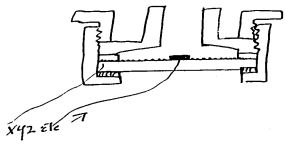
244 Wertheim says coeff of elasticity varied by Elec Current independent of the heat caused by its passage.



Try Ag German Silver Pt Pt-Ir
Cu Fe Ni Co Rea metals Steel,

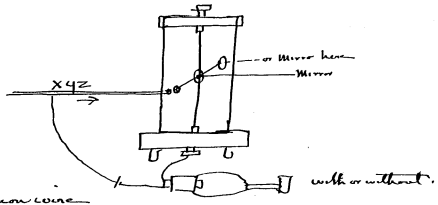
245 for recog sound waves over iron wire make telephone receiver with adjustable air chamber adjustable by screw from .005 to 1 inch to get resonance. A Brauly fastened to Dia might give results of constantly Electrified + Telfone Coil + bat used.

246



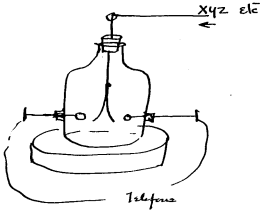
Telephone adjustable with mica diaphm + a glass dia heavily smoked over with lampblack from a pointed wick of Kero lamp and connected around edges + center. The passage of wave of E XYZ across lampblk heats the air + if there is a break tuning fork giving say 200 per second for each dot formed of waves millionth second it will give

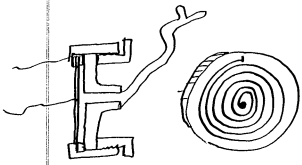
Sound for instance a dot lasts 1/4 second formed of waves going at rate 1000 000 sec the wheel throws intervals 200 sec



Torsion wire
Try diff metal —

247





Disk of porous pot or Lithgh or oil alone painted over with solute opual of graphite to make high Res — Then put in Telephone Receiver chamber

Passage XYZ Etc Exposures air —

248 Possibly fused Iodides can be made to mix with thermo alloys of light spec grav. Thus might make fine alloy also with Sulfides Selenides, Tellurides, Arsenides, Phosphides Nitrides

249 Organic liquid battery
Copper poles in organic liquid non conducting with an organic salt of Copper dissolved see if Can plate with Current, also other metals

250 It may be possible to make a storage battery with organic liquids. The Zn salt of an organic acid sol in the liquid + an oxygen strong salt say an organic acid Manganese salt & Pb. It wld have great Res but plates could be large numerous + very close together - say .003 made like a Condenser. Res might be got low enough - No local action on Zn EE as solvent not decomposable by Zn.

251 Quinone has greatest power to crystalize of almost any known substance. If even small quantities are sublimed crysts an inch long are obtained, This means something abnormal. Its so volatile that at Even ord Temp it sublimes from one side of the vessel to the other also crystlze from H_2O has strong odor irritates the eyes. Its a strong oxydz agt In alkali absorbs O from the air turns dark obtained by ox of Quinic acid - Can be detected

one part in a million by Hydrocaeroliquone why not soak paper in Quinic acid + Hydroc + then with platina point oxidize by current for chem Telgh
Its a peroxide use in battery S says its a powerful oxdzr like peroxides generally
Quinhydrone is another abnormal subslance (Schorlemer see) Green hydroquinone forms the most beautiful subslance which organic chemistry has yet produced crystals bear a resemblance to the feathers of humming birds when cryst on white porcelain presents a most beautiful appearance.

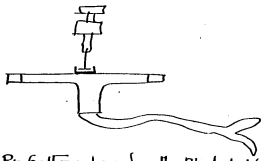
252 Hydroxy quinonoxime or Mononitroresorcinol
Decomposes without melting

253 Azoresorufin test for alkali Sensitive for Chem recording

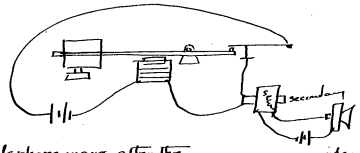
254 Resorcinol blue, discolored by Zn dust, very sensitive
Use with Pt point H pole Chem Telgh.

255 Pyrogallol in water turned brown by nitrous acid
use nitrite K + platina pen O side as K gives black
this with parallell pens gives continuous mark.

256



Cup with Pt bottom faced with Pt disk 1/4 dia + fitting fairly close to celluloid or ivory of cup in the cup put non conds oils etc for XYZ. & Sound if non conds do not work try Cu disks + Blue vit also Cu + Pd also KOH to make gas if for gas use ivory disk + .001 pt point center ivory + flush to increase density



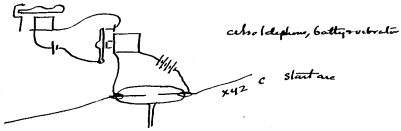
also XYZ

257 Telephone waves after the quality of the fork sound
by modifying arc at points use 10 cells + wind mag to out to get long arc at points, Ultra from arc should alter tone when striking arcing points.

258 Organic liquid Storage bat, Try as base benzol and req grids with Grafite + OX giving substances + other grid with an oxdzble material Pyrogallic A Hydroxylamine + such like insol in Benzol.
after trying a large number change base liquid from Benzol to Pyridin + so on.

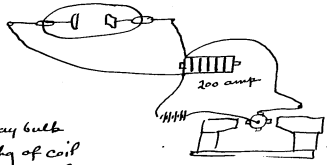
259 I think O or OH might pass across a non conducting liquid even charing the other electrode + which being continuously charged and discharged give a current. by millions of static stress charges without any current passing thro the liquid at all. persistence in exploiting will surely turn up something startling in this direction plating Zn on Magnesium films in KOH proves that static stresses can give current if frequency is great (10) a Dielectric can be stressed + destroyed millions of times a second by chemical reactions within the dielectric.

260



small Vac lamp actual size, exhausted for best point for spark — wires .001 apart also use in dark box alone + notice light, Various changes running on it test with Etheric 1st —

261



Req X ray bulb
try discharge of coil
by break wheels air
also in Magnetic field possibly get stronger result than with any induction coil —

262 Organic Storage Bat

Its likely that with Ni_2O_3 + Fe grid in an organic hydroxyl compound dissolved in an organic liquid that OH will be transferable.

261 Get all the cornel aniline color salts with structural formula see Allen Roscoe + S. these salts can be easily manipulated to make many compounds for organic XYZ + storage

262 Amido-Azobenzine easily O + Reded to a weak mono acid & salts decomp by H_2O.

263 Chem Telgh— Helianthin Tropaeolin D. Orange III Dimethylamido-azobenzene changed from yellow to red by acids used instead of Litmus (Ammonium salt) Phenylamido-azobenzene-sulphonic acid K salt. acid colors red also used for titration

264 Chrysoïden dis in dilute shellac used by photgrs paint windows dark room. see Roscoe + S Vol 3 310

265 Conc Sulphuric a non condr dissolves lots organic substances, dis Aniline black forming Sulphonic acid salt Easily Ox + Reded. Batty. Indophenols Easy Ox + Reded. ditto Trichlorophenol blue Lauths white, Leucothionine Ox extreme rapid in air Methylene White + Blue Ox + Reded easy

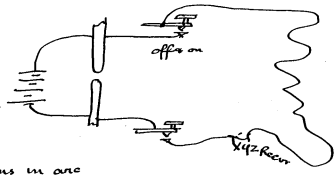
266 Try experiment with a thermo pile that when iron is magnetized its temp falls same as when junctions of thermo has C passed its gal. cold

267 Curious remark in Ganot. Whenever the effects of Electricity are reversed heat is produced Whenever the effects ordinarily produced by heat are otherwise produced cold is the result !

268 Obtain large piece Scheelite cut out a prism have a slit like a spectroscope + guard all around slit with lead have it in dark box use telescope as with spectro see nature of spectrum if widens + try X ray liquid absorbers etc

269 See if Oxalate Lithium can be fused under pressure + if so if it fluoresces by arc light if so make a prism also try in reg spectroscope with quartz prism in the ultra see what part Oxlate Li fluoresces in —

270

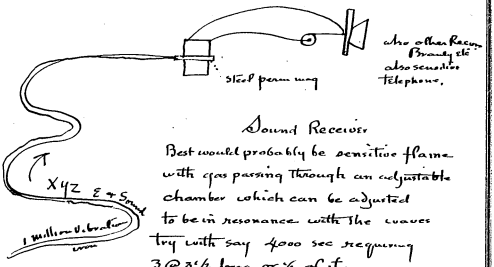


Vibrations in arc
sending waves analogous to sound

271 Improvement in Telephone Induction coils.

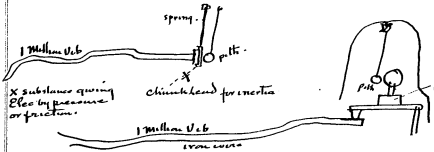
Secondary wound with flat ribbon To act like a Condenser made very thin + then foil (tin) it will be sharper.

272



Sound Receiver

Best would probably be sensitive flame with gas passing through an adjustable chamber which can be adjusted to be in resonance with the waves try with say 4000 sec requiring 3 @ 3 1/2 long or 1/4 of ft.



Sound waves impinging on crystal gives pressure etc.

273

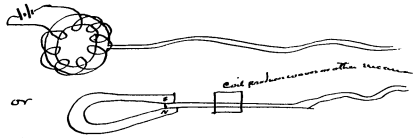
no coil.

1000 V dynamo Telephone powder coalesces by volts + sound-waves decohers no coil of to 6 loud dif powders

274 CuS should alloy with every other metal, also FeS CoS NiS etc giving an unlimited number of thermo alloys.

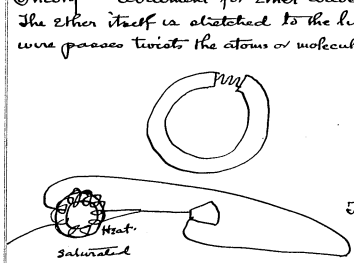
275 Acetylene gas might be good for sensitive flame.

276 Transmission of sound waves over iron wires may want an abutment?



Theory abutment for ether waves
The ether itself is stretched to the limit when Cu wire passes twists the atoms or molecules

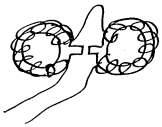
277

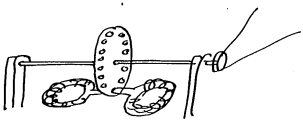


Thermo abutment tiny

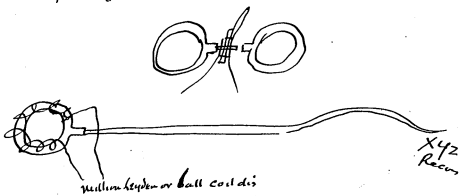
278 If Becquerels theory is right that thermo etc due to unequal heat conduction of a circuit then Cu + one of those Manganese alloys used for Res ought to be good.

279 Clammounds Thermo gives 6 watt hours for 3 Cubic ft of gas or 2 Watt hours per cubic ft gas
375 c ft per hph gas at 70 c at Orange 25 c hour
if no depen this wold do for charging our Storage Bats

280 
Etheric abutment.

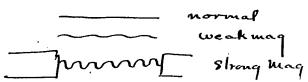
281 

Try whirling crystals attached to a disk
Especially several fluorescers (Thos) through the abutment gap Try whirling Coil etc
also for X y z etc



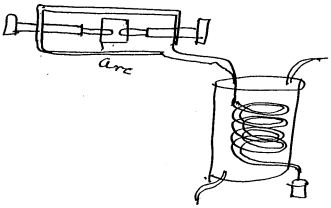
282 Theory

When an electromagnet is made by current the molecules or molecular crystals set themselves parallel + in lines at right angles to the wire they butt on each other, in so doing the Ether lines which between the poles at air gap instead of being straight are now bent just as in a vibration of light, the stronger the magnetism the great the bow of the Ether wave



A Copper wire loop passing through the Ether waves when straight + normal offers no resistance because the line has great elasticity, hence no C but if Ether lines is bent in waves near to limits of elasticity then it offers resistance. When the Cu loop is open there is no abutment + passing the loop through the molecules of Copper are seperated by the Ether lines + no work done but when the Cu loop is closed the molecules abutt on each other + as the Ether is near its limit of amplitude it requires work to force it through The distending or disturbance of the Cu abutments as each ether line passes of which there are millions in a inimeter causes a wave to pass + this is given off as heat If this wave or movement of molecules is transferred to other places it gives off heat there What gives direction is that the abutments are either closer at one end of magnet than the other This point should be wkd out more direction is the differently

283



Air free CO_2 + O. Lime + Carbon with arc
forms Ethylamine Condense + absorb
by an acid Make Ethyl alcohol.

284 Stearate of alumina swells enormously in Benzol if slightly heated probably one lb stearate of make 100 lbs Benzol jelly its like the ether of space Try Experiment

pour Benzol on top see if it runs out pure benzol on bottom thro sieve 200 mesh at any particular point.

Photography — X Ray XYZ

Iodide Hexyl — acted on by light
Mecurous Iodide exposed to light turns yellow then red
Calomel becomes dark grey when exposed L
Mecurroso-Mecuric Iodide Sensitive to L
Mecurous Oxide decomp in weak L even decomp by pressure
Mecuric Ox gradually blackens in sunshine
Tetramecurammonium Carbonate turns grey when Expsd to L.
Mecuric Iodallylide changes color when Expsd to L
Mecuric Iodethide easily Decompd by diffused daylight.
Phosphate of Methyl turns grey in L Watts 3rd 993

Possibly Syrian Asphalt on glass in Chlorine would be acted on by light. also film chromic acid which oxdzd becomes Insol also Gelatin surface in Chlorine also Gelatin with N_2O_3 put on surface + Expsd also Na peroxide Cathypo Napermang Co_2O_3 etc Acetylene Ether pure or mixed with other gases sometimes detonates with Chlorine even in diffused daylight if Ether is in excess, products are HCl + Carbon

Bromine even on foggy day unites with acetylene after a time explosion occurs.

Allylene is acted upon by Br in the shade

Allylene di-Iodide turns brown in light
Iodallylene C_3H_3I Cryst inch long very
sensitive to light 1st Sup Watts 97 + 98

Benzylene Bromide is an oil changes color Expsd L

Orthotolyl Mercury salt crystals decomp by L
ditto Pb salt,

Nitrobromoxylene (Benzine) turns red expd to L
1st Sup 294 watts

Diamidomesitylene turns red Expsd L Cryst,
1st Sup Watts 300

Anthranilic acid or Amidosalylic acid
Pb salt turns yellow Expsd Light,

Paranitrobenzyl Alcohol. Cryst turn yellow in L

Several double Iodides of Bismuth (1st Sup 348)
are quickly altered by L especially in what L
surfaces alters Bi Iodide also.

Solution Bleaching powder or CP HypoCa
gives off O in light.

Chrysogen Solution quickly becomes colorless in L
1st Sup 459.

Acid Potassium Vanadate in contact with organic
matter turns blue in light 3rd Sup 12.33

Oxalate Hg Sensitive to light + Radium emanations

Phosphenyl Di Bromide Liquid turns yellow in light & decomposes depositing a red substance.

Benzyl di-selenide Crystals exposed to sunshine turns from yellow to red

Ammonium Benzyl Selenate (White Cryst turn black exposed L.

Conine Hydrobromide turns red Exposed L

Tetranitrodinaphthylmethane liquid turns yellow Exposed L

Dioxy thymyl 2 thtylene Cryst Easily altered by L

Bromine in sunlight presence H_2O oxidizes many organic compounds (neutral) to acids such as Benzol. Toluene Mannite Sugar Glycerine.

Thallium Chl sensitive to Light

As mediums for films. on glass for holding substances acted on by light.
Albumen — Agar Agar — Gelatin — Collodion Paraffine — Damman Varnish Rosin in Ethyl rather resins Alumina trihydrates Gelatinous silica, Na Silicate Dextrin Tragacanth Starch gluten Balsam fir Gutta Percha Rubber Balata Mastic Varnish Amyl Collodion Reg Collodion Molasses & glue, Cellulose from Zn Chl Shellac Varnish Iceland moss Fish glue Ferricyanide Cu — Slippery Elm, Gluten,

Plates of all the inorganic acid salts containing different metals with Ag such as Tungstate Chromate Etc

Cuprous Chloride very sensitive to light
1st sup 493 3rd sup 566

Tungstic acid in presence organic matter reduced to blue oxide by Light.

Iodoform dissolved in CS is excessively sensitive to Light colored violet owing to liberation Iodine

Uranyl salts highly sensitive to Light

Gold Trihydroxide decomposes + gives off O Exposed to L

Aurous Cyanide must be made + washed in the dark very sensitive to Light,

Chlor-auric acid Sensitive to light.

Note Possibly Iodide Nitrogen in gelatin etc on plates might be decomp by different rays Ultra red for instance so could photo in dark X XYZ etc

Formate Ag decomposes when moist even in the dark Formate of Hg does the same
How about Au & Pt Ir etc Crystals formate Hg decomposes by pressure possibly radiant heat decomposes in dark—

Potassio-Mercuric Oxalate sensitive to Light & heat. also Ammonio-Mercuric oxalate.

Diazonitrophenol yellow powder turns red Exposed L also Diazonitrochlorophenol.

Platinochloride of Diazobenzidine Cryst when drying turn brown when Exposed L

Hydrobromate of Azophenylamine Explodes violently by heat, friction or pressure

Nitrate of Azophenylamine Explodes with terrible violence exceeding fulminate of Hg or Iodide Nitrogen Explodes at 100 C. friction or pressures.

Azobromophenylamine is a very dangerous compound, the slightest pressure or contact with a rough substance causes it to go off with fiery Explosion Exceeding Azophenylamine

Chloroplatinate of ~~Cl~~ a Chloroanilin cryst turn violet Exposed L

Ethylanilin Decomp by L

Ethylidene-diphenyl-diamine Cryst gradually turn red Exposed L

Calcium salt Nitrocuminic Acid gets darker when Ex to L

Ferrocyanide K Solid + Liquid slowly decomps to Prussian Blue by L

Ferridcyanide K very easily by L

Nitroferricyanide K Changed by L

Nitroferridcyanide Na more sensitive to L giving Prussian Blue

Dry HgCy in Chlorine gas decomp by L

Evidently there are numerous substances that can be put on glass or metal plates within a cell with Chlorine gas & photos taken in Camera also X & XYZ

Cyclamin turns brown exposed L
Solution in sealed tube Exposed L deposits white solid —

Digitalic acid affected by light

Many organic substances prone to oxidation at slightly raised temps in the dark not oxdzd but when at same temp are Exposed L are rapidly oxdzd Especially Indigo blue Tumeric, Color of flowers bleached.

Ericinone Cryst Effected by L

Iodide Ethyl colorless if flowed on Hg & Expsd ☾ decomposes to red iodide Hg formed liberating Ethyl other metals than Hg does it this is good substance to experiment with.

Monochloronated Chloride of Ethyl, Chlorine dissolves in it abundantly & there is no action in the dark. expsd ☾ violent reaction, torrents HCl, Evidently ☾ has some connection with Chlorine, in Chl aq in req photghy.

Chloride Au in Ether deposits gold expsd ☾

Ethylene Dichloride of Platinum (solid) becomes brown or black Expsd ☾

Fulminating Ag blackens Expsd ☾

Furfurol turns brown + some even in dark

Gallotanic Acid acquires yellow color Expsd ☾

Trichloride Au decomp'd quickly Expsd ☾

Auric oxide reduced by ☾

Guaicum changed Expsd ☾ especially Violet ☾

Acid Chromate of Quinine rapidly d when Ex to ☾

Racemate Hg colors on Ex to ☾

Hydrocyan—Rosaniline colorless turns red Ex to L

Rosolic acid Rosolates easily d by Ex to L losing colors.

Ruthinic tetraoxide sol H_2O rapidly D Ex to L

Santonin turns yellow Ex to L.
Dichlorosantonin ditto

Ammonio-Mercuric Sulphite decomp to Hg globules by L it even decomp in dark in sealed tubes.

Metanaphthylsulphurous acid Pb salt turns brown Ex to L

Chloride Thallium Dec by L

Thymol product oxdtn Thymol. D by L

Thymol in Chlorine gas sensitive to L

A certain protox of Sn blackens in L

Acetate Ethyl in Chlorine in Sun Explodes

Aqueous sol Citric a in Chlorine in Light changed to Hexachloroacetone

Iodide of Acetyl in presence Hg D by L

Iodide Mercurallyl turns yellow in ℓ

Sulphurous—Iodotrimethide (p 885 Last Vol) Crystl quickly browned Ex ℓ.

Mercurous Benzoate turns yellow Ex ℓ

Cocothelene product action Nitric on Brucine browned in ℓ Vol 1 700

Sulphide Allyl precips Hg turns black in ℓ Watts Vol 1 1144

Arsenate Cu & NH_3 dd by ℓ Vol 1 381
ditto Arsenate Cu —

Dimercurous Arsenate changes color by heat
do Sulphantimonite Stibiethyl powder.

Chlorine in foggy weather acts on Acetic acid to form Monochloroacetic A.

Solution acid Chromate K mixed with NH_4 or Ethyl deposits brown sediment in light not in dark—

Phosgene gas action Cl on CO in ℓ forms Chlorocarbonic acid—

Chemicals Electric by friction

Oxalate Calcium "

Bebirine " amorph powder

Bucunimanga Resin "

~~Ch~~ Cinchonidine " pure white powder

Disacryl, powder, " Strongly

Elemi Resin shines in the dark when rubbed
Dry Radium

Glycosine strongly Electrified by trituration,

Hydrosalicylamide Lead salt highly Elec by friction
Dry radium

Myristone Elec by friction Dry Radium

above from Vols 1 2 & 3 Watts
enter balance,

Lead tetraphenyl J Chem S 54 1888 283
see Polis (Ber 20 3331 3336 Chem S Jnl 1887 572

Dichroïns compounds having fluorescent + dichroic qualities see Brunner + P Chuit Ber 21 249 256 Chem Soc Jnl 54 1888 p 363 also Kramer + Brunner C S Jnl 1884 1354 do Lieberman C S Jnl 1874 693.

Phosphorescent Blende A Verneuil C Rendus 106 1104 1107 do 107 101-104 Chem S J 1888 1248

Action ZnCy on Metallic Chlorides by R Varet C Rendus 106 1080-83 also C S Jnl 1888 54 799 780 good—

For dissolving Cellulose Acetone-Chloroform C.S.Jnl 1888 810 also Jr Pr Chem [2] 37 361 374

Action Pyridin on Metallic salts C S Jnl 1888 54 850 good—

Emf ferrocyanides Espcly FeCy + FeCuCy

Uranates of Ethyl Methyl etc Ammonia C S J 1888 918

Acetylene best absorbed by 95% Ethyl alc Sol Ag Nitrate if in excess dis precip all hydrocarbon compounds of acetylene series form compounds mostly Cryst C S J 1888 930

Na or K Tungstate equal molecular proportions forms salts with Tartaric a. C S J 1888 938

Anilin Combns cuprous Chl C S J 1888 1000

Action alkaline phosphates on alkali Earths fusion good C S J 1888 1033.

Double phosphates Magnesium group fusion good C S Jul 1888 1035

Benzene derivatives of high molecular weight Pentadecylparatolylketone etc. Kraft. Ber 21 2265 2271 C S J 1888 1087 do 1887 252

Dichroïns C S J 1888 1182–83.

Chl Zn combines with amines + basic organic substances picolin Etc Nitrates sometimes Cryst from alcohol. C S J 1888 1281

Dichroic cryst C S J 1880 41 105 106. + 644

Phosphorescence in Vacuo Pt Cy Key Etc C S J 1880 204

Diphenyl salts C S J 1880 476–7

Uranium oxyfluo compounds with fluorides of alkali metals C S J 1880 794 853 also A Ditte C Rendus 91 166 168 do 91 115 being fluorescent compounds of Uranium

Double salts Propionic acid C S J 1880 799

X Ray fluorescence

Benzoate Ammonium
Salicylic " "
Ba Fluoride
Tungstate Ba fusion
Ba SulfoBenzoic
Tungstate Beryllium ; precip. fluoresc.
should make some by fusion.
Cd Sulfate Bromide Chloride Iodide.
Cd Oxide $CdWO_3$ not so good as $CaWO_3$
Cd Bromate.
Calcium. Formate. Nitrate Salicylic
Sulphurosum Fluoride Iodide phos
Pectolite (Silicate Ca)
Soda Lime

Calcium Carbide fluoresces when directly exposed to the electric arc
$CaMo_3$ $CaWO_3$
$CuWO_3$ —

Iron Acetate, Dialysed

Lithium, Bromide Benzoate

Oxalate of Lithium powerful fluorescer when exposed directly to the Electric arc, ie Ultra (+ Phosphorescence and long lived) Could not Dup
Try again might be impurity in arc Carb try different
Lithium Bichromate Electrofluorescer 2" away

X Ray fluorescers

Lead Tannate Sulphate Iodide
Tetrametaphosphate Bromide
Chloride Carbonate.

Molybdic acid.

Mercury Bromide phenylate Subchloride
Mercurous Chl Mercuric Chl

Potassium Iodide Bromide Silicate.
Salicylate,

Silver Carbonate Chloride

Sodium Cresolinic Salicylate fluoride
Bromide Carb Chloride Tungstate.

Plumbate Soda. Electrofluorescas 3" away
ditto Iodate Na very strong " "

Strontium Salicylate Acetate Tungstate
Chl Tungstate fused Molybdate,

Sulfide Strontia quite strong fluorescence
direct arc light fused may be better
too Opaque for good X fluorescing

Uranium Acetate Phos Nitrate Sulfate

Zinc Tungstate Phos Acetate Chl Carb fused Molybd
(Hypophosphate Electroflus 3" away), Tungstate,
not so good as $CaWO_3$

Ferrocyanide of Zinc powder conducts
a spark jumps thro the box curious!

X Ray fluorescers

Miscellaneous

Gold + Key — good
Zirconium + K fluoride good.
Mercury Oxycyanide.
Caesium Rubidium + Ammonium Bromide
Bi + Ce Salicylate
Bi Sub Benzoate
Na + K Carbonate
Li + Benzo salicylate
Li Benzoate
Acid Sulfosalicylic

Ore specimens

Monozite sand some pieces very good ?
Calcite. Fluorite Rock Salt. Zircon Hyacinth
(Danburite. Borosilicate Ca)
Orthoclase Andalusite (Si Al + K)
Pectolite (Si of Ca) Pyromorphite (Phos chl Pb)
Apatite. Herderite. (Phos Al Phos + fl ca)
Wulfenite (Mo Pb) Scheelite.

Crystals made by myself fusion in Salt,

No 1	$BaMoO_3$	
No 2	$ZnWO_3$	fluorescer
3	$CdWO_3$	fluorescer
4	$ZnMoO_3$	very slight
5	$CdMoO_3$	~~fluorescer~~.
6	$BaMoO_3$	fluorescer
7	$SrMoO_3$	fluorescer

No 2 has apoto that fluor better than scheelite
7 + 3 have good apoto but No 2 very brilliant.
4 5 + 6 no new lot. No 3 3/4 as good as $CaWO_3$
No 2 only 1/2 as good as before
probably made wrong ?

Best X ray fluorescers are

1st Pt Ba Cy
2 Calcium Tungstate.
3rd Cu K cy
4 Sr WO_3
5 Hg Diphenyl.
6 Salicylate Ammonia.
5 " Strontia

Possibly Zn WO_3 Can be made to be better than Ca WO_3

following undetermined

Subchl Pb ~~Hg~~ Iodide Cd Ur Nit KBr tetramelaphos Pb KI fluorspar PbBr PbSO4

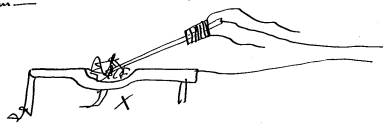
with smaller coil - 5 to 600 blks sec best is Pt Ba Cy Ca WO_3 Cu Key ^ Hg Diphenyl Salicylate Sr acetate Ur -
Hg Diphenyl gives no phos like Ca WO_3 !

Jany 22 1903.

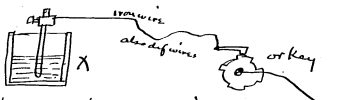
Try and photograph the spitting sparks from different metals by closing a circuit with big condensers across surface Each metal gives a specific spark also try sparks due to abrasion with Emery wheel? Try powders reduced by Hydrogen known in flames generally investigate this subject that every metal should give a different shaped sparklet is certainly strange Try alloys - see if 2 or 3 metals in alloy can be detected by scintillations, Did this Prof Holland has records, interesting

Investigate the smell of Tin, see if its a vapor or a field of stress affecting the nose,
Test the variation of friction when a metal is rubbed over paper etc resting on Tin

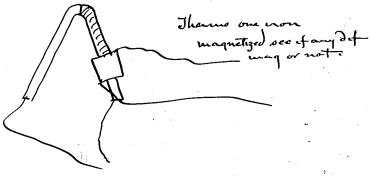
Run down the Argillaceous smell of alumina.
Clay etc, all clays smell also precipitated alumina — loses smell by heating. What is this smell — an element gas or an influence or Opaque Radium, or adsorferous Radium —

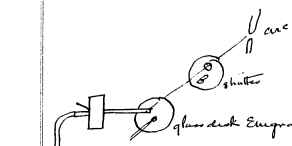


X Blacksmith forge Anthracite or Coke, Iron rod see if any thermo current ditto when rod magnetized,
also —
Heat one end rod red hot then suddenly plunge in water & Connect helix to Galvanometer see if kick at moment of cooling — ditto try XYZ — Receivers —



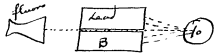
X cell filled with acid or other liquids attacking metal. theory being chemical reactions sends molecular waves through wire
Can use iron wire & rod of different metals in the cell —





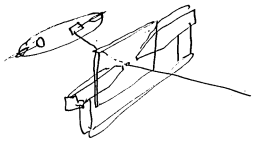
platina or other points acc of beam light allows
Coefficient of friction, ditto X ray Lead shutter,
besides glass use other transparent materials
Rock salt Celluloid Gelatin, transparent
Agl Mica

Try small cylinder of Pears soap in Malograph



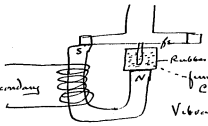
B is cylinder of lead - ~~little~~ with 10/1000 hole thro the
Center or less, B is 3 inches long. X ray beam
passes through hole, use magnet, Coil on outside
also heat B acc of ray can be affected,

Possibly some of the many fluorescence
I have found do not fluoresce to the real X
ray but to other rays possibly a screen
that would cut off X ray might not cut off the
XX ray or that the order of sensitiveness of the
fluorescers might be changed when retarding
substances intervene Try experiment by Eyes
photo on slides with different absorbing screens
to see if screen acts alike on all - Make a specially
well made slide with all the fluorescers then absorb
by plate glass, then air then aluminium etc
if all act alike then its all X if not then there
are other rays or many rates of vibration each
rate having a specific fluorescer, not so absorbable
by the screen

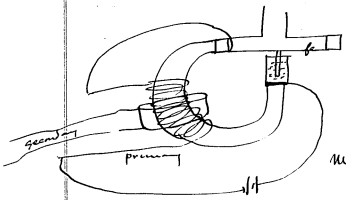


Lead plate fine 002 hole, look fluoroscope by magnet pole also light ray also jump spark on ray just as it leaves lead to see if it can be affected by flame arc light mag etc.

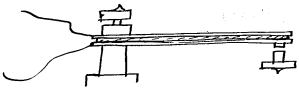
January 22 1903



Vibration disturb filings & vary magnetism.



Double action.
Magnetism & Current



Engraph action annual membrane KOH, nearly dry two platinized springs possibly glue rush of liquid changes stiffness on one side relaxes other stiffens hence spring curls

possibly a long piece of Carb Strontia with Koff. + foil pasted on sides would cause bending

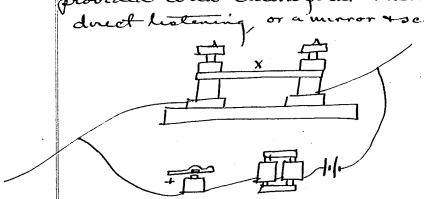
Perhaps in photographing fluorescent slides different results be obtained by having them in magnetic field—

X Ray tube—Iron plate, try effect in magnetic field—

Connect wire to top of flag pole on Laboratory + connect end to X ray tube at top + bring down into Galv Room—

Do not forget to make experiments at Ogden over the ore body for sudden changes in earth Magnetism also for sounds due to rapid vibrations of ore body brought about by Cosmical magnetic changes Sun spots vibrations affecting the Magnetism Aurora,

Possibly there are very rapid Barometric changes or waves continually occurring that could be detected by an Aneroid diaphragm provided with Carbon point Microphonic direct listening, or a mirror + scale,



X Carb Strontia, Koff— drives on and + opens Circuit =

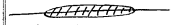
Jany 22 1903

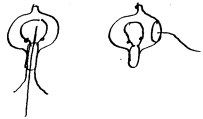
spectroscope

see if X ray passing through prism affects the Lines

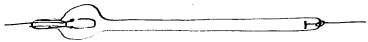
Jany 26 1903

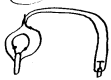
Complete the experiments with the Center wire in Lamp bulb also with platina foil outside the bulb – get quantative measurements;





Solid glass heat & use
Current blackening wire,
use Lead Lime, Glass,
Borax fused also other clear fused glass like



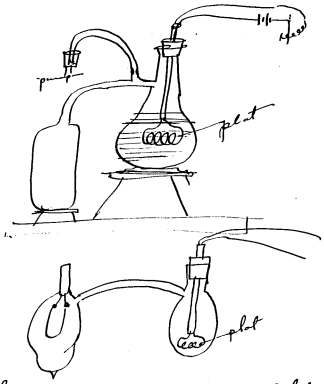


for Center wire experiments,

Make smallest Pea lamp with lowest voltage that will give current ~~[illegible]~~ possibly 1 or 2 Volt battery, see if X ray affects the Current given to center wire Try alternating Current possible that Center wire will give straight Current, & act as a transformer – Try Center wire Lamp in Cold Oil see if affect Current, also outside pt foil Lamp – Use photometer & Weston & bring up 6 Lamps by Kind tube beat determine highest candle power –

Try and reproduce the iridescent film within the Lamp bulb when Paraffine is inside & bulb heated to get Vapor —

Try distilling in Vacuum — by platina wire use paraffine etc see what it does — also try sublimming different subliming Chemicals in Vacuo — in reg way & under influence X ray light from arc Magnetic field, static etc,



Distill in vacuo & crack by heat of filament, get new Compounds =

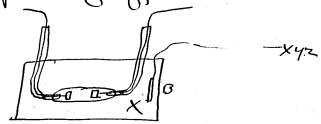
Try the best fluorescens for light & Becquerels phosphoroscope & get one that has the most brilliant phosphorescence for light for 1/20th of a second dying nearly out within that time so a screen can be made for the Kinetoscope & prevent flickering

Test all fluorescence phosphorescence for X ray + for light. when crystals are shaken in Vacuo tube in dark also grind in a glass mortar with glass pestle in dark – determine if all X ray fluorescers have the property of giving light when broken — possibly there are many chemical crystals which will give light when ground in the dark by a Count 100 also might be many that in Vac tube would also give light, Could put a dozen in one mix & if any light could run it down & find out the one —

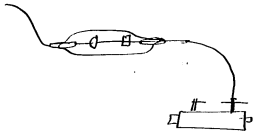
I believe that all good depolarizers when are hydroxides. Hence to make PbO_2 to work in Delande it should be made of Hydrated peroxide of Lead when mfg'd chemically – Mix with graphite + use Zinc amalgamated & H_2SO_3 — Try KOH + a colloid seperator —

Try if Delande CuO plate soaked in HgO in ammonia to get 5% HgO into pores of CuO plate Keeps volts up also Zinc + reg CuO in turns the amount of KOH,

Possibly CuO can be melted under pressure used to better advantage as to Voltage & cheapness of Mfg —



X ray tube with glass guards immersed in H_2O also liquids which absorb X ray in X lank notice phenomena also cool + hot liquids – also B plate in liquid give X-ray



High Vac (Very) X ray point, Continuous wire
face of Luminous —
(19) of our Vacuo space
Conduct better than the wire,

If Ions are free then $FeCl_3$ or $FeSO_4$ Electrolyte, in a powerful portent pole field should deposit on one side towards the field

For monochromatic Light, Bromide of Sodium is the best salt to use in open flame
Hg for tubes.

Radium may be radiant matter at ordinary temperatures while other matter would be radiant at higher temps by photology thro opaque sheet from incandescent metals kept hot by flame or Current, also in Hydrogen flame also monochromatic light from salts of metals say Bromides by wick in flame give 24 hours time —

Make a transparent Cell that can be put into a Camera like a dry plate use say Cu Electrolyte, + polished silver plate + a wire of Copper + focus a picture on plate from light of arc or sun often deposit Copper with extremely weak Current or deposit will just show in 3 or 4 minutes, see if light affects deposit, so as to give a picture possibly following

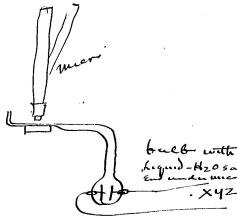
would work — use no current but a highly polished plate of a metal in the solution of a metal just below it in the electrolytic scale one which the plate metal will not reduce, possibly by the aid of light the metal will be sufficient to reduce the other metal from the solution & deposit thus giving a picture — There is quite a field here. If a Quartz lense is used to use polished plates of the metals immersed in various solutions & then by the action of light especially Ultra produce a reaction between the highly polished surface of the plate & the solution — possibly in some cases organic matter would be useful to assist —

Try Chloride of Sodium solution & grid with iron to take care of Hydrogen & see if Chlorine bleach of silver is blackened if not develope & see Try acetate Pb Mn Ni Co salts & make black oxide deposit very faint — Then with current when picture is focussed on polished plate.

Use spectroscope and monochromatic light pass X ray through the light try different vapors of metals especially he any metals in flame in air try tube other metals in vacuo tubes also in addition to X ray put both in powerful Mag field.

Try capillary bulb ~~with~~ 1/4" dia fill with good absorber X ray ~~test~~ of X ray

moves capillary Column absorbs Column under Microscope —



above scheme could be applied to observe many things —

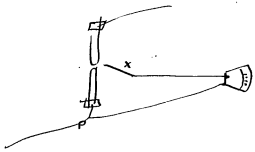
Celluloid cell with different Electrodes solutions with galv for voltage put in Mag field also use cell as a dielectric also act on it by X ray or both or one Electrode also in out Mag field, also heated + cooled + while charged.

Make a small coil with inside big enough to take the thermo alloy buttons we made by electric furnace + by galv Rick method test for magnetism,

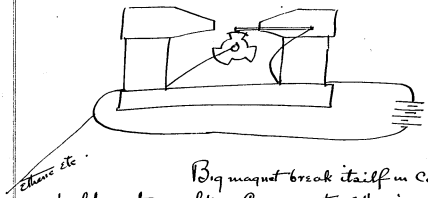
See if X ray affects the catalytic action of Platinumblack

Find a semi-permable substance for different rays from Vac Tube to seperate the dif rays + Photo them —

Send mechanical vibrations into a long buried steel wire use microphone point on the end of the wire to make a sound have this sound control a 2nd mechanical vibrator to send into 2nd wire with repeators might go as far as Phila — The internal knock of the molecules by surrounding end with coil + use storage batty + break wheel. 2 or 300 amp Mag spark break — or Marconi ball spark, or heating + plunging in Water



See if Center wire idea applied to one light will give Current, bare wire X — or X in a Vac tube might do something —



Big magnet break itself in Cone field get snap like a Cannon. try Etheric & XYZ.

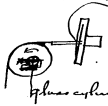
It seems to me that a peculiar thermo could be made by having a metal with very low specific heat. like Lead joined to one of high spec. heat. & only get current by momentary heating the low spec heat metal would get quite hot before the other showed much of any heat this should do something although when both were at same Temp would give nothing possibly it might give XYZ if no Elec By proper commutating of the heat powerful thermo currents might be obtained

Spec H wood charcoal	0·24
Crystly Boron	0·25
Magnesium	0·25
Lithium	0·92
Lead	0·03
Bismuth	0·03

perhaps the momentary kick of Halo when one drops a metal in an Electrolyte is due to above action
Mg + Bi or Pb should make good combination

as spec heat of Electrolytes is high + head low a Commutating head wheel might give Current by dif of spec heat —

Why is it that when an X ray or lower stage of Exhaustion tube is sparked that rubbing finger over glass produces difference of friction it acts like Chalk of Motograph — that shows a static motograph is possible.



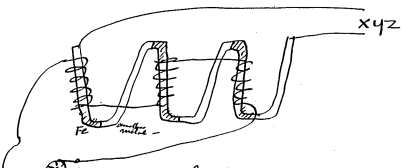
Glass cylinder Very thin inside filled with Hg — + connected to Earth, gold foil rubbing on glass + Connected to Diaphm —

Melt some Magnesium - do Aluminum in very high Vacuo + pour to one side of bulb cool — use Current to melt, I think both are alloys with their own oxides + in this way can get them pure possibly they could be distilled in high Vacuo —

It is very strange Mg + Al gives no coloration to Vacuum tubes can it be that CP metals are transparent —

What effect will X ray have on a Soap bubble.

Make some of the easily fusible glasses such as Borax, Borate Lead, Apatite + see if they can be blown into X ray tubes —



1/4 Ebonite strings hanger — Molecules disturbance give wave heard on XYZ Recor

If ions migrate different velocity then a Vane or plate suspended in electrolytic cell. can be detected by a mirror & Beam light movement take place by unequal movement.

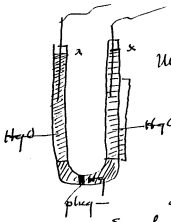
A Platinum negative should be capable of printing by X ray as Pt absorbs ray —

In addition to the electric wave of an oscillator on coil used by Marconi there must be a sound wave sent into space perhaps a flame would detect it. a million vibrations a second would require a resonator 1/64 long possibly a porous plate 10/1000 thick say 1/4 dia connected at base of sensitive flame the pores would act as resonators & affect the flame if this is so possibly the Molecule might work instead of Branly the friction being given on dry porous substance. by rarification & condensation.

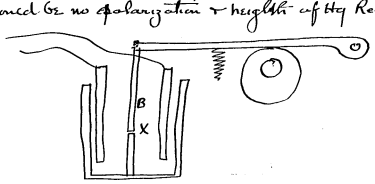
If X ray is due to particles shot out then a disk of platina 1/2" dia suspended by single fibre inside celluloid Cover to keep air currents away & Scale provided with Mirror scale & Lamp & screened from X ray or half of it should give a deflection

to my mind what is called X ray is a sound wave of a million or more per second a throw of atoms.

X ray bulb within another bulb with electrodes one of steel to get very high Vacuo & see if X ray passes through the high Vac from the tube X coated to X ray point, while the residual molecules are used in the inner bulb to give the concussions to produce the ray. The ray itself may not pass through the higher Vacuum which is too high for production of X ray



showed Gr no polarization & weight of Hg Read off.



Sparkless make and break, Rubber cell Sulph Zinc Zn Electrode X partition upper half moved up & down liquid conduction practically stopped when B touches X Elc could use magnetic & make automatic vibrator, Also KOH & Ni $(OH)_2$ pockets both sides —

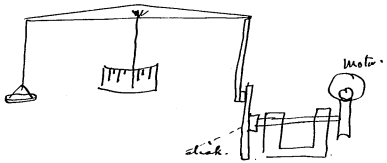
January 26 1903

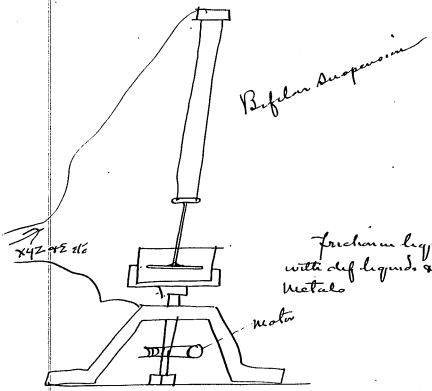
Storage Battery.

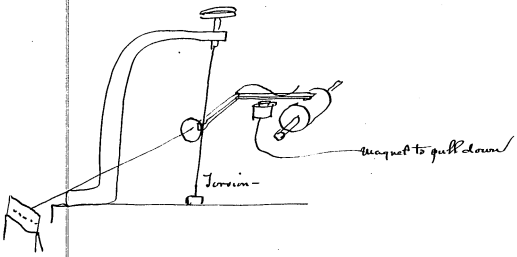
KOH Electrolyte saturated with PbO. grid filled with PbO_2 Hydrate Copper finely divided in other grid when discharged Cu_2O + Pb_2O_3 when chgd — Cu metal PbO_2 Hydrate

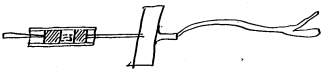
Copper metal not being able to reduce the lead, instead of Copper possibly all the metals lower than Pb in the electrolytic scale, from Pb to Cu —

It is possible that the friction between different kinds of highly polished matter is very susceptible to alteration by all forms of Energy stresses & changes of Condition & that instruments based on alteration of friction would lead to the discovery of many phenomena Especially as the apparatus is run by power & the energy or stress merely controls the source of power that moves the apparatus,

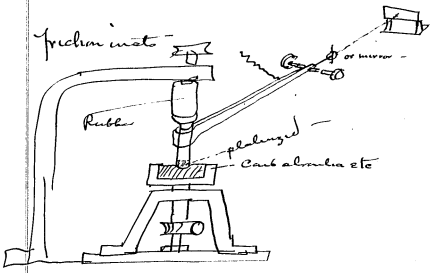


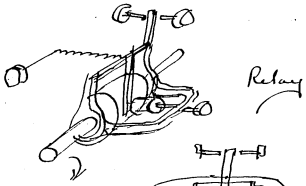


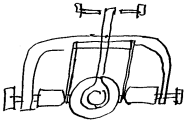




Branly to telefone - movement powder
makes sound







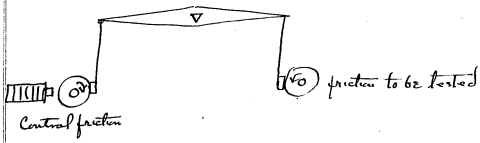
General Experimental purposes
Chloride Silver fused in an atmosphere of Chlorine is perfectly transparent
Ditto Bromide of Silver in atmosphere Bromine

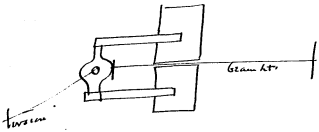
ChlK BrK KI from clear crystals produce on fusion perfectly clear masses,
How act ChlPb in atmos of Chlorine —

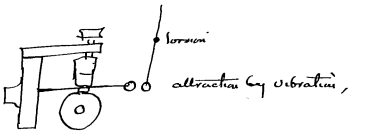
Arsenic sulfide with Sulphur 3 of Sulphur to 1 of AsS solidify to soft amorphous mass becoming hard & brittle after a week
Possibly good for Phono cylinder —

What is the effect on a Ring armature if wound with a coil & two rings to take off current, & over this the regular armature winding & Commutator.

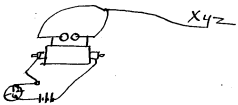
friction insts







High notes in Matogh—



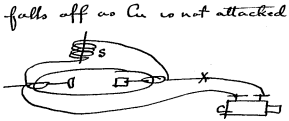
Bombardment sends waves molecular by condenser & rarefiction thro wire. use Cu Fe wire & XYZ inst at end. Cut off all Elec by burying wire 3 ft in ground ~~wire~~ wire 100 ft long. Above device gives Millions atoms knocks per second. shown gives XYZ at great distance over bare wire buried in earth possibly X ray tube give big knock—

I am almost sure a primary coil giving Etheric will do wireless as good & not better than Coil. all that is necessary is very sharp breaks & great amperage with but few turns,

Possibly a storage battery could be made with both Electrodes one of spongy Cu in KOH the other ~~[illegible]~~ plain Copper on oxidizing goes to Cu_2O The plain Copper forms bottom of cell. in which Tellurium powder covers on charging spongy Cu oxidizes to Cu_2O while Te Combines with H to form Hydrotelluric acid + K salt, on discharge O oxidizes H + precipitates Te to bottom cell ~~[illegible]~~ Galvanic probably in this

Put a little test cell Ni Fe storage in strong Magnetic field + see if action of Magnet on Fe affects amperage or Volts while being chgd + discharged perpendicular at right angles — No effect.

Hydrated Peroxide Lead in Copper grid. Copper plate. Electrolyte Sulphate Cop
Chgd — Copper PerOxPb + saturated sol SulphCu
Discharged — OxCu PbO_2 reduced to Ox + SulphPb
no reduction Pb on Cu as too low in scale.
nothing falls off as Cu is not attached by SO_4



Try effect Shunt S with Fe around also at X also mass of Condenser.

The universe is composed of matter + the medium

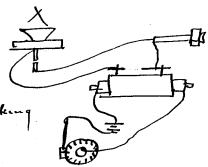
Matter disturbs or distorts the evenness of the medium or Ether.

All transformations of energy is the transfer from high to low pressure or equalization of distortion in the medium—

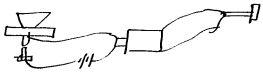
Transfer is brought about + is transmissable by the great difference between the inertia of matter + the inertia of the medium

In a Battery for instance the oxidizing metal acts by its inertia as a fulcrum or abutment to throw out the stress, The wire of the circuit is the plane around which the wave passes the inertia of the matter composing the wire permitting right angle ramifications + condensations in the medium without loss of Energy in the medium but the wire not having perfect inertia is heated at absolute Zero the wire would have, probably perfect inertia relative to the medium The stress travels along transversely like light, the waves being very long at right angles + unlike light which are very short,

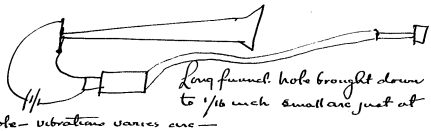
Feby 1, 1903—



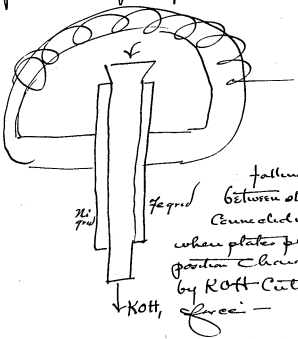
Jumpspark wheel making
2000 vib sec—
by talking in X
Varies—

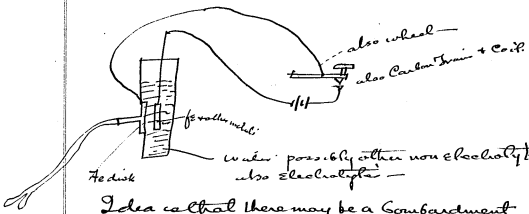


small arc, hard to vary its resonance,



Try using Molograph with Carbonate Strontia, as a battery when turning— it reversible see how voltage is— also what amperes can be got from it— possibly a low resistance could be obtained also try with different metals, both holding Chalk & point, might be lot of phenomenon come out, in Chalk Cap form precipitates to see if Caust better Even Carb. Strontia, same permanable precipitates.

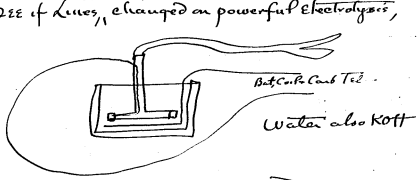




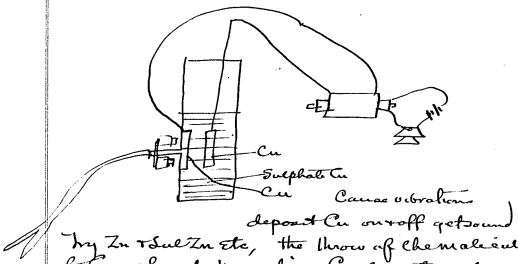
Idea is that there may be a bombardment of molecules producing pressure. possible an electrolytic compound could be thrown into + out of solution for each reversal of the telephone Coil current + the osmic pressure produce a movement of the diaphragm — Some electrodes could be used that permit a small amount of oxide to go into solution + then plate out. Al — + Mg — dia or electrode Reverse Ct Try alcohol, + Organic Clear + with things in it, try in Mag field also as dielectric also beam Light Heat, X ray —

or absorption

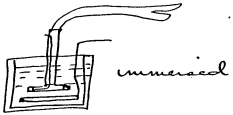
Qzz if Lines, changed on powerful electrolysis,



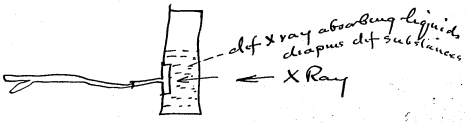
Animal membrane see if forced Osmose to + fro by alternations produce sound.

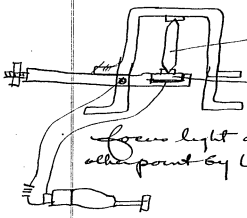


Try Zn + Sul Zn etc, the throw off the molecule of Cu showed more dia Co deposits under strain might be good — Lead + Hg molecule being heavy might be good — also put a magnet near dia + use sulphate non the non deposited is attracted + when off attraction ceases showed Bano limit to thro — possibly the dia could be of mica with 1/16 thin disk of Cu in center + non deposited would be concentrated, possibly 1/1000 inch point + magnet get within .003 of the end of point would be very sensitive,



This form would be very handy to try quickly a lot of experiments on this principle — make + break whoof. also Carbon Tel + Coil Perhaps dielectric oils give sound sensitive flame instead ear tube might detect sounds of extraordinary pitch,





Focus light on ship + control beam at other point by telephone

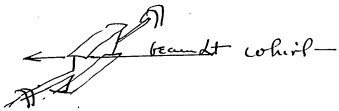
July 1 1903

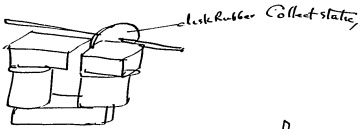
On silver discs for Carbon/telefone possibly a number of metals reduced by Hydrogen from their oxalates worked work — Plat black Ag Cu Ni Co Bi Au Pd Ir Ru also Ni S + Si amorph. our battery Graphite also amorph Graf purified as we do it —

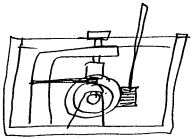
Experiment well on sensitive flames as it may be possible as it may be possible to get them in connection with a telephone far more sensitive than the ear Could be used with above device to repeat + then get infinite sensitiveness + rapidity possibly sensitive flame would be modified by strong field mag as it has great influence on flames; possibly waves could come into magnet + influence the flame

Possibly Combustion in flames are a series of Explosions (?) molecular Explosions at combustion they might be propagated to a distance to affect another flame both sensitive a shutter + telefone showing it up —

as a flame is so easily affected by a magnet perhaps it would give an alternating Current if placed between prongs of a permanent mag surrounded by a coil & a telephone used with revolving wheel etc to break it up into waves or a Branly would detect the Current or a Bifilar Electrodynamoler with no iron This would be a great scheme the molecular explosions disturbing the lines of force possibly a trompe Could be used with the gas to throw the flame in front of the field & then give sounds or waves







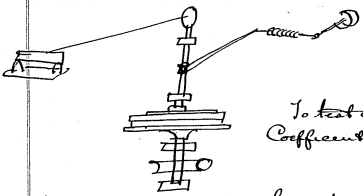
A sort of a Motogh to test thermo current due to Rubbing The cylinder being of one metal & point the other — immersed in distilled water, test Current with Weston

Feb 1 1903

See if the scintillations of Mg Fe etc occur under distilled water also gasolene also in a Vacuum! & if preserve their character, see how scintillations changed in Magnetic field — or within a helix with powerful current passing also in powerful static field!

Try X ray 24 hours on a flower having leaves guard 1/2 the flower & leaf by sheet lead.

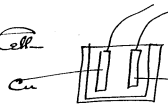
Coefficient of friction should be changed by X ray —



To test change in Coefficient of friction

by X ray Light etc glass discs ground dead flat

Storage Cell



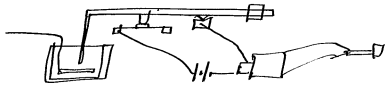
Liquid Cerous sulfate
finely divided Cu

Cu

Manganeous sulfate, also sulfates of metals which are decomp by H_2O. & which form ous & ic sulfates.
Chgd Cu Cerric sulfate, Dischg Cerous sulfate Cu_2O —

Feby 1 1903

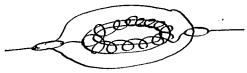
Possibly instead of Cu metals further up the scale could be used so long as they will not reduce Cerric to Cerous of themselves possibly Pb Sn Sb Co — possibly Fe but doubtful — all finely divided with Hg mixed or Cu Hg mixed with them — Thin grids possibly Cobaltic + Cobaltous Sulfate old be used, Better try Cerium hydroxide once more getting pure stuff mix 5 + 5 graphite + 400 poison possibly get it act as well as Ni hydroxide,



Electrolytic cell —

Current or X Y Z Either moves Pt wire by surface tension or gas formation works Microphone

Deposit Fe on glass in high vacuo do it on pump use double electrode each a loop so a current can be passed through loop to heat loop up + drive off gas etc then by spark deposit on glass anode protected Want to see real color free from oxidation Try all the other metals including Silicon Mn Ferromn Tungsten Cr Te S Se C Graphite Sn Sb Zn Cd Ag Cu Pt Ir Ru Pd Ru Or Pb Th Co Ni pyrosulfite Sulfides dont deposit so will be opaque Then try things with them absorption in spectroscope X ray photo by thru fluoresce by Light thru, Conductivity etc



Very high Vacuo small ring magnet, with coil wire Balance in bridge & Read Rick right along as Vac gets better note any change

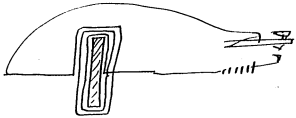
Also wound spool with 1000 ohms & put in Vacuum put in bridge & measure Res as Vac goes up Try of rapid breaks & reversing makes any difference.

If Brauly will work surely a gold leaf or Equivalent will work and a beam of light or shadow could be used to read signals by also use as XYZ Recvr

Try jump spark points with spark adjusted so it will not jump except in Ultra Violet then try if any opaque thin sheets will conduct ray try nimochromatic & also proximity of masses of metal, also proximity of heated metal & Chemicals, might some give radium Emanation & act like Ultra Violet, X ray —

Since Nofe storage bat has such enormous discharge rate could use a primary like Etheric & by breaking 1000 amperes between poles of magnet get an Etheric so tremendous that the X ray tube would give extraordinary results, also wireless taking it should make enormous Voltage of secondary used & a vicious spark between balls The number.

of breaks could be one or two so a few turns wire which might melt in one second, with 100 amp would stand 1000, or more for fraction of a second could use in oil also a simple coil without iron would give enormous results. possibly this would have to be in oil although oil would make wave less sharp possibly put in Vac tube could get new results + self induction would be at minimum - This on end of iron wire should act as a powerful molecular sledgehammer for X y z waves Remember old jumbo at Gorrick jump spark as amperes went up.

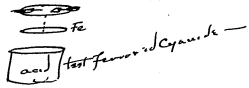


Make iron core condenser a la jumbo this.

wind - foil Copper wound around so have 10 or 15 times as many disks as were on jumbo moulded with japanned bond paper baked then try with several hundred amperes diameter 3 inches put in oil + see about Ether X y z etc.

If in X ray tube an atom strikes the glass Wienatzes passes through glass + impulse is given an atom outside by stress thro glass + this atom by its velocity is thrown into the flesh - Then a dish containing acid in which

The most sensitive reagent for a metal is in acid solution the interruption of a very thin metallic plate between X ray tube at top of cell & the acid the metal atoms phoned or thrown into the electrolyte & in time give color reaction,
or if thrown on a platina plate the metal would be plated to it & after collecting for a while could be dissolved off in a minimum of acid & tested by the most sensitive reagent, the phoned proof of matter is actually thrown by the X ray —

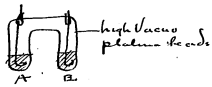


Perhaps a more sensitive test would be to put a platina plate within a hydrogen flame & then between the X ray tube & flame put the very thin metal or material & throw the atoms against the platina plate in the flame where they would give spectra, lets crystals could be used —

Perhaps by using a hydrogen flame & metallic nozzle to earth & platina loop with a metal or oxide of high fusibility on it in flame that it could be used as a Branly or XYZ with spectroscope,

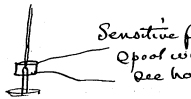
Make a Tungstate Ca screen the Crystals being mounted on thin lime glass by fusion then try effect of sensitiness increased or diminished by heat, magnetism, or both by the fur other fluorescens

There might be a storage cell in high Vacuo to get low temp oxidation, thus

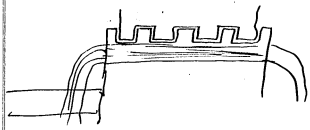


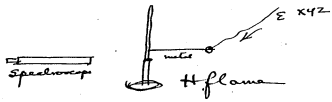
End contain Dry chemicals high 1200 Volt Current, produces Vacuo Electrolysis finely divided Fe in one + Dry $N_2(OH_2)$ in other $PbO_2 H_2O$ in one Zn as Mn etc in other passage of a spark or Ct in one direction charges + in the other direction discharges + O Combining with Metal gives light at very low temp Cold Light like oxln of Phos

Possibly tubes exhausted beyond X ray point will be best to get XYZ or connect with the medium free of matter — remember steel Electrode absorbing residual as 10" spark wouldnt pass, then when no spark pass perhaps the 1000 ampere Elheric Coil will cause production of another kind of ray or XYZ. Try this kind tube mag field Ultra [illegible] —



In small motor for automobile - increase magnetic radiating surface thus

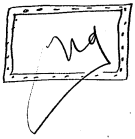




When wave comes spectra appear - diff metals — salts etc.

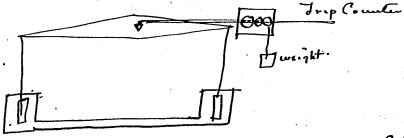
Oxalate Uranium very sensitive to light actually a solution of Oxal Ur decomposed by light Co Co_2 Remarkable salt,

Dry plates, light + cheap for photghy.



make like Kinato steel strip

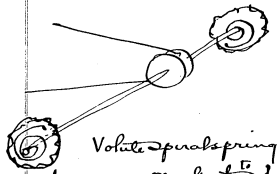
Feby 5 1903 —



Meter KOH Solution No pockets — Shift Hydroxyl by Current around shunt, should be perfect meter —

Feby 5 1903 —

The cups could be of platinum or pure nickel possibly HgO instead $Ni\,OH_2$ wold work, Even if mixed with HgO as in battery might do, shunt in main line, the suspension wire could pass thro fine hole to prevent Carbonating



Volute spral spring to connect driving sprocket & shaft to equalize also drive chain on starting.

[ITEM FOUND IN BOOK]

#1

Make an alloy of
92 parts of Cadmium
+ 7 parts of Bismuth

Mix 60 parts of the
above alloy with 40
parts of Antimony

Make Enough to make
a Cylinder for Chalk
Telephone

(0)

[ITEM FOUND IN BOOK]

~~Zinc 85~~
~~Bismuth 15~~
~~Antimony~~

#2

Make alloy of 85 parts of Zinc
15 parts of Bismuth.

Then take this alloy &
mix 35 parts of the alloy
with 65 parts of Antimony

[ITEM FOUND IN BOOK]

Diorite - Diabase
Stable gangue
Every granite sample panned & plain -
Sand panned back - plain & panned
Samples every kind Rock in bank - Crushed - plain & panned
Samples Cr panned all known ore samples - lost -
" " " Pulling now ore & gangue
Samples K & Rizon known samples -
" Oregon Nickel -
" Trade Oregon samples -
Cannot Rock samples,
Limestone " " panned & plain -
Black sand samples -
Diamond gangue removed -

[ITEM FOUND IN BOOK]

Light fluorescence —

Calcium Carbide — to arc

Lithium Oxalate "

Balmain's paint Sun

Sulphide - Barium

" Zinc —

" Lime,

Strontium

~~Molybdate Calcium (fusion)~~

~~Tungstate Calcium~~

[ITEM FOUND IN BOOK]

~~Barium~~ Best

Platinum Barium Cyanide.
Calcium Tungstate
Cuprocyanide Potassium.
Strontium Tungstate.
Mercury Diphenyl.
Salicylate Ammonia.
" Strontia

[ITEM FOUND IN BOOK]

Ores –

Monazite sand-pieces.
Calcite
Fluorite
Rock salt
Zircon Hyacinth
Danburite. (Boro silicate Ca)
Orthoclase andalusite, ($SiAl_4K$)
Prehnite,
Pyromorphite.
Apatite.
Herderite. (phosphate of Ca)
Wulfenite. ($MoPb$)
Scheelite.
Zn. Tungstate has apatite better than $CaWO_3$ – fusion

[ITEM FOUND IN BOOK]

Zinc Tungstate fused.
" Phosphate
" Acetate
" Molybdate.

Gold & K. Cy - good
Zirconium & K Fluoride - good
Mercury Oxycyanide
Caesium Rubidium & Ammonium Bromide.
Bi & Co Salicylate
Bi Subbenzoate.
Sodium & Potassium Carb -
Lithium & Benzo-salicylate
Lithium Benzoate
Acid Dulfosalylic

[ITEM FOUND IN BOOK]

Silver Carbonate
" Chloride.

Sodium Cresolinic
" Salicylate.
" Fluoride
" Bromide.
" Carbonate,
" Chloride
" Tungstate,

Strontium, Salicylate,
" Acetate,
" Tungstate ferrous
" Molybdate,
" Chloride

Uranium Acetate,
" Nitrate
" Sulphate,

[ITEM FOUND IN BOOK]

Molybdate Calcium (fusion)
Tungstate Calcium "
" Copper "

Lithium Bromide
" Benzoate

Lead Tannate
" Tetrametaphosphate
" Bromide.
" Chloride,
" Carbonate.

Molybdic acid –
Mercury Bromide
" Phenylate
" Subchloride
" Mercurous Chloride
" Mercuric Chloride
Mercury diphenyl.

[ITEM FOUND IN BOOK]

Benzoate Ammonium
Salicylate "
Barium Fluoride
Tungstate of Barium - fusion process
Barium Sulphobenzoic
Tungstate Beryllium precip
Sulphate " Cadmium by fusion
Bromide "
Chloride "
Iodide "
Oxide Cadmium
Tungstate "
Bromate Cadmium -
Calcium Formate
" Nitrate
" Salicylate
" Sulphide.
" Fluoride
" Phosphate.
Pectolite (Silicate Calcium)
Soda Lime.

[ITEM FOUND IN BOOK]

4265 – Strong Cuprocyk & SbCy
4270 Strong " dissolved in sulphur salt.
6424 Strong at 1st instant – Sulfate Ur & Ba
6433 Strong Sulfate Uran & Pb
35371 Strong 2 grms K Tungstate & 2 grms BeCl
1538 Fair KBr & KCl
33948 Fair 2 grms K Sulfite & 5 mlg CaCl
4267 Strong Cuprocyk & MoCy
4268 Strong " & CeCy
4148 Weak Permolybdate Tartrate & Zn Tartrate
4246 Strong Cuprocyk & MnCy
4263 Strong " & PbCy
4264 Very Strong " & BiCy
7333 Phosphorescence Phtalic acid & K_2CO_3 & S_2O_3
7579 Strong Sulphosacchrica & Zn(OH) & S

[ITEM FOUND IN BOOK]

21094 - Strong - Ca Sulfo-meth S.S.
21087 Strong Sr Salicylate.
30418 Very Strong - KCl 2 grms. Ur Sulfite 2 gr yellow C
32967 Strong 2 grms Zn Br 2 grms Ba Fluoride
33039 Very strong 2 grms Ba Br & 2 grms Ba Fl.

4253 Very strong - Cuprocy K & Cd Cy
4254 Very strong " & Cr Cy
4259 Strong " & Fe cy
4260 Very strong " & Hg Cy
32056 - Strong 2 grms Cuprocy K & 1 mlg Ur Sulfite.
9002 P-Strong P-Cresolinic Ac & Carb of Na & Bi
32133 Very strong 2 grms Sr Br & 2 grms Zn Cy
32825 Very strong 2 grs Cd Br & 3 mlg K Cy
32811 Very strong 2 grms " & 2 grms Ca Borate.
8074 9000. P-Cresolinic Ac & $Al_2(OH)_6$
8175 Very strong - Borobenzoic Ac & K_2CO_3 & $CaCO_3$

[ITEM FOUND IN BOOK]

2706 – Very Very bright. Hydrofluoric Acid NH_4OH, 4/16/90

4868 – Ur Cy & Hg Cy

35269 strong 2 grms Na Tungstate & 2 grms CaCl

35305 fair " & " CaFl

35293 strong " & " Ca Borate

35290 strong & 9 mlg Ca Borate

35395 strong " & 2 grms Ca Borate

35389 fair " " Ca Silicate.

4263 Very Very strong. Cupro cy K & Pb Cy

4254 strong " & Cr Cy

4264 strong & Bi Cy

4260 strong & Ur Cy

8079 strong P-Cresolinica & K_2CO_3 & $MnCO_3$

[ITEM FOUND IN BOOK]

21135 Very strong – Uranium acetate.
6157 strong M-Cresotinic + Sr_2CO_3
30169 strong SS 2 grms Sr chromate + 25 milg $AgNO_3$
20807 strong. Sr Salicylate
30671 strong SS 2 grms NaCl + 3 milg KCy
30791 strong – 2 grms Sr Phos + 3 milg AgCl.
30790 strong 2 grms di Phos + 1 milg AgCl.
31683 - strong 2 grms CdCl + 2 grms Ca Phos
30009 weak – 2 grms KCl S S S Radium
30047 weak " K Sulfate S
35473 strong 2 grms K Molybdate + 2 grms CaCl
35971 strong 2 grms K Nitrate + 2 grms Mn Sulfate
20234 Very strong. Iodo-sulphosalicylic acid
20214 strong Zn Salicylate
20194 strong Fluorine S S